Ecological Modernisation at the Periphery: An Analysis of Greenhouse Development Opportunities in a 'Clean Green' Australian State.

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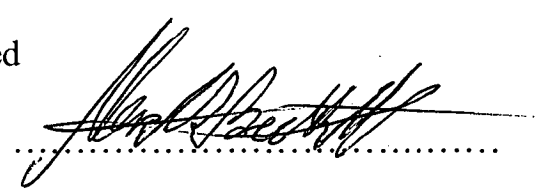
Mandatory Declaration

This thesis contains no material which has been accepted for the award of any other higher degree or graduate diploma in any tertiary institution. To the best of the author's knowledge and belief, the thesis contains no material previously published or written by another person, except when due reference is made in the text.

Signed 

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(June 2001)

To Betsy

(The one you didn't have to read!)

Abstract

Concern over greenhouse gases and the onset of global warming has become international in scale. Business opportunities arising from greenhouse gas abatement have been correspondingly recognised, and the potential advantages of less greenhouse intensive processes are being explored for any available market advantage. With this recognition comes a need to ensure that abatement is occurring, and that environmental benefit is a real outcome.

Ecological modernisation theory posits that capitalist business behaviour can benefit by building into its activities environmental stewardship, thereby contributing to long term conservation of global ecosystems. The theory is explored, defining terms and discussing insights and limitations. The nature of greenhouse policy and definitions of what might comprise a greenhouse abatement industry are then established. This background provides a basis from which to investigate the business opportunities and constraints of genuine ecologically driven greenhouse reform.

The thesis employs two case studies from the small Australian state of Tasmania. They depict how the theory of ecological modernisation is translated into practice. The Tasmanian government owns two businesses that significantly influence the state's greenhouse profile - one managing forests, the other renewable energy resources – and these have been chosen. Each case is tested against a history of environmental conflict and in the context of current marketing of a 'clean and green' image for the state. On this basis an assessment of what ecological modernisation can achieve is made.

It is concluded that the environmental discourse characteristic of greenhouse policies cannot be translated into significant business opportunities due to difficulties involved with investment risks and with breaking from traditional development paradigms. Outcomes tend to constitute technological add-ons (evidence of weak ecological modernisation), or, in the worst case, a continuation of existing unsustainable practices within an environmental guise. This confines policy goals and production outcomes, and directly results in overstating environmental gains, a constriction of socio-political discourse, and undermined marketing potential in terms of environmental care. The

promotion of greenhouse potential is therefore likely to be little more than rhetoric. The study concludes that, while ecological modernisation provides a theoretical framework through which trends can be ascertained, it fails in a prescriptive sense, for it does not explicitly cater for the uptake of environmental stewardship in the confines of strained economic circumstances similar to those of Tasmania and, perhaps, other types of economies.

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1. Introduction

1.1 The Thesis

In the three or so decades since the birth of the modern environment movement, environmental problems have become more global both in scale and nature. Many environmental problems can no longer be managed by countries in isolation as they transcend national boundaries and have become truly global. At the same time, nation states have lost much of their sovereign capacity to shape or influence their own economies as these have become more entangled with an increasingly globalised economy controlled not by governments but by transnational corporations.

Towards the end of this period expressions of environmental consciousness also became mainstream. Politically, there have been world environment summits and world environment days and in industry, Environmental Management Systems and associated technologies and practices have grown to become almost universally applied tools. Within this context, the language of environmentalism has become part of the everyday parlance of both governments and corporations.

This phenomenon, a near-universal adoption of concepts such as sustainability by governments and industry, constitutes a discontinuity. That is, it appears that a new era of environmental consciousness just suddenly erupted. This has led to significant academic debate among environmental and political theorists. How and why this phenomenon has occurred has become a topical question and within this debate the concept of Ecological Modernisation (EM) has gained currency. EM is a conceptual framework that acknowledges this move of environmental consciousness to the mainstream and accounts for the institutional uptake of sustainability ethics, doctrines and strategies. It is an optimistic environmental prognosis postulating that through technological advancements, market pressures and government policies positive environmental outcomes can be achieved. Central to EM is acceptance of the global

capitalist economy and a core belief that critical environmental change will need to occur through capitalist endeavour.

This study examines what EM as a theory is able to achieve. EM theory is outlined through a review of the literature, and an exploration of definitions, criticism and appraisal. Strong and weak versions of EM are identified. The debate largely revolves around the degree to which EM is a useful ideology to achieve positive environmental reform or a doctrine reinforcing business as usual. Analysis of EM arguments will attempt an understanding of the extent to which EM actually occurs. It investigates the capacity for EM to be used as a guide to the interpretation of organisational behaviour and asks the question of whether EM and the particulars of ecologically modernised behaviour are successful in achieving good environmental outcomes in general.

The study then posits that, at least within certain economies, EM is unlikely to translate into a strong commitment to the requisite environmentally benign behaviour. In particular, smaller, more peripheral and more resource-dependent economies, it will be argued, are more constrained in what they are able to achieve in terms of EM. The thesis of this study is that within isolated economies that are dependent on commodity prices and other global processes, governments and corporations will tend to take on the rhetoric of EM both to legitimise attitudes and as a necessary tool of competition. The thesis uses Tasmania as a case study and within Tasmania, two studies focusing specifically on the Government Business Enterprises (GBEs), Forestry Tasmania (formerly the Forestry Commission) and the Hydro Electric Corporation (trading as 'Hydro Tasmania', formerly the Hydro Electric Commission – colloquially know as 'The Hydro') that manage resources with significant greenhouse implications.

The core thesis question is to what extent environmental concerns are a genuine driver of reform rather than something that is superimposed on a business-as-usual approach that largely ignores environmental issues but attempts to legitimise its activities on the basis of perceived environmental benefits. To test this thesis EM is used as a tool to evaluate greenhouse abatement strategies and the discourse of both Tasmanian GBEs. The greenhouse effect is a naturally occurring process whereby solar energy which has entered the earth's biosphere, is trapped by carbon and other trace elements in the

atmosphere which absorb radiant heat and in turn may result in general raising of global temperatures. Primarily, contributing elements result from the combustion of fossil fuels and the release of carbon from naturally stored pools (reservoirs or sinks) such as forests or oil deposits. In the following discussion 'greenhouse abatement' is sometimes shortened to the single word 'greenhouse', as commonly used in policy discourse.

Chapter three defines a 'greenhouse industry'. This is because 'greenhouse' has rapidly become a globally-embraced environmental issue, with government policies and environmental reform strategies looking to reduce the greenhouse effect, particularly by encouraging acceptable non-punitive commercial reform. Once the greenhouse industry is defined and the precarious state of international environmental politics and global pollution reform discussed, application of greenhouse policies within the Tasmanian case study will be observed. This will form a basis from which to critically assess both opportunities for business development through environmental reform, and how the two GBEs are placed to embrace this. Chapters four and five will respectively examine greenhouse opportunities in public forestry and public electricity management, while at the same time exploring the political and policy backgrounds of both. This will demonstrate how EM can be used to justify business-as-usual behaviour.

These cases have been chosen primarily because of the impact of their development paradigms on the environment and upon the emergence of the environment movement in Tasmania. On the one hand a government managed forest agency has been historically committed to such practices as clearfelling old growth forests for woodchip production, and on the other, a government-managed energy agency has a development regime historically based on the inundation of large tracts of wilderness for the generation of hydro-electricity. The irony is that to participate in global markets, the two GBEs have seen their contemporary competitive edge in making claim to a 'clean, green' mode of production, conveniently overlooking the fact that their past disregard for the principles of environmental management provided the key impetus to one of the world's most high profile environment movements.

While the pressures of environmental stewardship exist, business as usual arguably persists. Forestry management in Tasmania has, for example, seen a transition from concessions for saw-log supply, to woodchips for pulp, and most recently, to establishing new plantations in order to retain a market for woodchips. In the case of hydro-electricity, large blocks of subsidised electricity produced by the inundation of wilderness areas have attracted greenhouse intensive industries to locate in Tasmania – a process commonly referred to as hydro-industrialisation. While it is widely conceded that hydro-industrialisation has reached its development potential in the island state, Tasmania's entrenched ideological commitment to increasing energy availability to attract industry has never ceased, and hydro-electric power is heralded as ecologically sustainable even by the Tasmanian Greens.

The thesis asks how applicable EM is to the two Tasmanian GBEs. It is argued that EM is unable to take account of the politics and strategies that isolated resource extractive economies must use to survive global pressures. Thus, central to this thesis is the notion of policy debt. For the purposes of the thesis 'policy debt' is defined as the historical and ongoing deficit in knowledge, expertise and strategies. Because local policies often evolve by following trends generated externally, by the time concepts, issues or information become entrenched, the practices and paradigms on which they have been based will themselves have been superseded elsewhere in the world. This creates a reactive policy environment that is often in a situation of debt - governments and businesses characteristically showing a lack of initiative and innovation, seeking answers from elsewhere. Circumstances such as this are later described as symptomatic of weak EM. If EM is adopted by businesses in economies like Tasmania it is more likely to be at the level of rhetoric than real environmentally positive action. This is because the disjunction between rhetoric and real change is much larger in resource-rich peripheral economies which characteristically better evidence the extremes of environmental assets (such as the presence of wilderness) and extractive resource industries (primarily because the resources are still there). Specifically, Tasmania has a history of resource extraction on a grand scale, and because this has caused social tension and created an advanced environmental awareness it puts EM and those espousing it in a difficult position. Businesses suggest they are environmentally-responsible corporate citizens in a number of ways,

including one-off ecologically sensitive activities, seeking forgiveness for past sins and proudly pursuing technological fixes to long running environmental problems. EM theorists note these developments and use them as evidence for change. But this is only really change if clear environmental betterment independent of the claims of rhetoric, is an observable consequence. Other aspects that clarify the uptake of EM include: understanding the values particular economies or societies place on the environment (by observing such things as environmental activism and environmental policies); the capabilities and opportunities that exist for ecologically sound economic growth (such as a mature environmental industries sector supporting development); and other factors such as quality employment opportunities in green jobs, and greenhouse profiles (such as carbon sinks and abatement programs). It will be shown that the GBEs responsible for forest industries and hydro electricity in Tasmania are taking all available opportunities to publicise stories concerning their greenhouse gas (GhG) reducing role, and it needs to be acknowledged that their activities do have profound greenhouse implications – growing trees absorbs carbon and hydro-electricity is renewable energy.

The irony is that it is exactly in the small peripheral economies that the extent of environmental damage has tended to be most significant. This, in turn, has generated significant community opposition within such economies to developments and activities that are damaging to the environment. Hence, such locations have made a considerable contribution to the emergence of the modern environmental movement. Whilst this has led many to assume that it is precisely in such locations that EM should occur, such an assumption is problematic. One could reasonably expect that EM would occur in these locations because all the right elements seem to exist – an effective modern environment movement and significant impacts resulting from resource extraction activities. In such environments companies might reasonably be expected to respond to pressure and meet environmental expectations. However, at the same time, companies and governments are driven by economic and community pressures to continue with the development paradigms with which people are familiar, and in which many people have an investment, and resource extraction, so that in the end no real change occurs. Companies and governments take on the trappings of EM in order to placate the environment movement, or more broadly, to undertake a public

relations exercise to make it appear that they are ecologically modernising, whilst in reality they avoid or limit as far as possible any change. That EM does not take account of differences in regional capacity, or explicate the contradictory pressures of business-as-usual and the move to environmental stewardship held to emerge through pressures to increase efficiency, demonstrates theoretical inadequacy – though I will, nevertheless, find a useful analytical purpose for EM. To test this, I utilise case studies from Tasmania, a resource-dependent peripheral economy.

1.2 Background Context to the Study

There are legitimate reasons for investigating potential greenhouse-based development opportunities. From the perspective of government, the core issues are developing instruments of policy to deal with GhG abatement, while for business the core issues relate to maximising benefits over the costs resulting from these policies. Interestingly, governments developing greenhouse policies behave like businesses in that they attempt to maximise benefit and minimise impacts of punitive greenhouse measures in order to achieve an attractive, globally competitive economic environment.

Greenhouse gas abatement goes beyond traditional pollution control in that the scientific community has generally accepted (not without contention) that certain gasses stimulate the process of global warming. Greenhouse abatement focuses on preventing the release of greenhouse gasses (emissions reduction), and enhancing the storage of the primary greenhouse gas, carbon dioxide, in the form of 'carbon sinks'. The opportunities for environmental benefits and the potential to develop business based on these processes are contingent on a number of conditions and forces ranging from local environmental factors to international economics.

Opportunities for reducing emissions range from individual companies abating industrial outputs to whole communities switching from fossil fuels to renewable energy sources. At present development opportunities and liabilities can be identified only on a speculative basis. However, a number of issues merit exploration. Examples

include carbon sinks, alternative fuels, renewable energies, efficiency measures and emissions reduction.

There are several instruments that can be used to either encourage or mandate a switch to renewable energy sources. Essentially, activities that displace fossil fuel usage can be rewarded or regulated, either through national tax based systems, regulatory measures, voluntary measures, by international protocol (such as the yet to be ratified Kyoto Protocol), or a mix of these. Economic incentives, combined with a concrete understanding of who owns 'the abatement' or stored carbon, will underpin profit margins in the future. It should also be noted that failure to reduce greenhouse gasses is likely to incur commensurate liabilities, including potentially substantial costs:

> *Company directors who ignore greenhouse issues could be in breach of their duties under Corporations Law... companies which cannot show they are working to reduce their greenhouse gas emissions can expect to suffer...* (Horden 1999:23).

Environmental duty of care as statutory obligation has evolved in various ways. The emergence of such legal obligations has occurred in conjunction with demands for environmental reporting and demonstrable environmental stewardship which are part of normal contemporary corporate practice. Examples include the advocacy of organisations such as the International Chamber of Commerce for the Business Charter for Sustainable Development; the Organisation for Economic Co-operation and Development and the World Business Council for Sustainable Development both advocating eco-efficiency; and global environmental reporting initiatives by the United Nations. A large number of global companies are taking on environmental corporate citizenship seriously, and in doing so, recognise that aspects of sustainability include using less energy, less resources and producing less waste, and hence improving bottom line and increasing profits. Evidence that these aspects of production are becoming entrenched in contemporary business behaviour (as opposed to mere wishfulness within policy statmentds) can be found in the Dow Jones Sustainability Index, which has shown that many companies listed on the stock exchange and reporting environmental performance are not only producing

environmental benefits, but also increased profits (ACF 2000). This trend is a central theme of EM theory.

How Tasmania's political institutions are attempting to react to (or exploit) this trend will be examined by a process of questioning core motivations. Real and measurable opportunities for greenhouse emission reductions will be examined, and the analytical approach offered by EM will be applied.

1.3 Structure of the Paper

The thesis proceeds thus. In Chapter 2 the key themes of EM theory are summarised, as is its place in environmental discourse. Chapter 3 provides a conceptual framework for interpreting EM through the environmental discourse of governments and industries. A framework will be developed from which environmental credibility in general can be assessed, via identification of certain environmental practices. This will provide a basis for determining greenhouse credibility specifically, so that it can be seen whether policy and practice are soundly based, leading to measurable greenhouse reduction, or whether greenhouse is a marketing ploy based on the construction of false perceptions. Combining the theoretical background of EM and an analysis of the greenhouse industry provides a basis from which to investigate two Tasmanian case studies.

Chapters 4 and 5 respectively explore the historical background and development ethos of the two GBEs whose business has profound greenhouse implications for Tasmania. Chapter 4 is about forestry and carbon sinks, exploring the opportunities associated with forests as a key natural greenhouse reducing resource. At the same time forestry is a major Tasmanian industry to which government contributes significant resources to ensure continual development, economic surety and employment. It will be demonstrated that the state's significant carbon sinks and timber industry are unlikely to be able to benefit from the real greenhouse opportunities likely to be available under current global greenhouse policy discourse, a discourse based on green credentials and the rewarding of carbon sequestering activities. In a similar manner, in Chapter 5, 'renewable-industrialisation' is presented

as a new hydro-industrialisation paradigm. The chapter explores the potential benefits of Tasmania's renewable hydro-electricity energy resource and assesses new greenhouse-driven 'renewable-industrialisation' opportunities. I question whether an organisation can maintain a shift from 'environmental vandal' and key driver of economic growth in Tasmania, to renewable 'green' energy for a new economic paradigm, and thus, whether 'historical' hydro-industrialisation can really be supplanted by a qualitatively distinct paradigm of 'renewable' industrialisation.

Ecological Modernisation provides a useful conceptual framework to explore the diverse literature on environmental industries and green jobs and to discuss those activities that might comprise the 'greenhouse industry'. This will provide a basis from which to evaluate Tasmania's green credentials and a methodology for analysing policy. An exploration of Tasmania's capacity to perform greenhouse gas reducing activities through carbon sinks, and the extent to which greenhouse opportunities provided through its forest resource base can be maximised, is discussed as a first case study, in Chapter 4.

The second case study, that of Tasmania's hydro electricity GBE (Hydro Tasmania), will be used to further illustrate the way institutions learn the discourse of environmental good practice, and to demonstrate the attractiveness of the discourse of greenhouse to institutions anxious to establish environmental credibility. The learning of a greenhouse discourse by 'The Hydro', demonstrates what is perhaps a global phenomenon in evolving environmental awareness as traditionally exploitative industries about-face and embark on environmental 'crusades'. Traditionally the Hydro has operated on the premise that increased hydro-electric capacity will provide a platform from which to attract further industrialisation. This reflects the traditional economic paradigm of an assumed 1:1 correlation between increased energy consumption and increased Gross Domestic Product. The more manufacturing activity that could be attracted to the state via cheap bulk power, the greater the wealth generated locally, including employment and associated business activity. Such hydro-industrialisation is now widely considered to have reached its capacity, with corresponding development potential - and policies - ceasing with it. But hydro-industrialisation is not dead - indeed, I will submit that the ideology that drove hydro-

industrialisation continues to thrive and has appropriated a green rhetoric of greenhouse sensitive development to justify the continuation of a traditional economic development approach.

2. Ecological Modernisation: identifying an ideology of ecologisation

This chapter considers broad eco-political concepts and evolving economic development paradigms that can be used to critically assess greenhouse opportunities or liabilities for Tasmania based on its economic and industrial capability, and its record of institutional intervention in greenhouse reform. Analysis of Ecological Modernisation (EM) will demonstrate its usefulness for illuminating the historical accumulation of institutional policy debt in a greenhouse context, to be explored through two case studies forming the latter half of the thesis. It will inform the specific observations to be made in later chapters on Tasmanian greenhouse policy, forest management and renewable energy management. The extent to which EM has been adopted in Tasmania will be demonstrated by assessing greenhouse credentials in these policy domains. EM will inform an analysis of the Tasmanian government's prolonged development focus in all spheres of management, whether it be public goods (for conservation), private goods (buying and selling) or natural goods (evolution/contingent biodiversity), and in the context of the contemporary relationship between environmental destruction and economic growth in Tasmania.

2.1 What is Ecological Modernisation?

In the words of Martin Hajer:

> *In the most general terms ecological modernisation can be defined as the discourse that recognises the structural character of the environmental problematique but none the less assumes that the existing political, economic, and social institutions can internalise the care for the environment* (1995:25).

In his interpretation of Hajer's definition, Dryzek notes:

> *Ecological modernisation refers to a restructuring of the capitalist political economy along more environmentally sound lines. Environmental degradation is seen as a structural problem which can only be dealt with by attending how the economy is organised, but not in a way that requires an altogether different kind of political-economic system* (1997:141).

EM has emerged through a general acknowledgment that sustainable development has become a universal concept and EM goes one step further:

> *... sustainable development would surely lose unless it could be demonstrated that environmental conservation were obviously good for business profitability and economic growth everywhere, not just that these competing values can be reconciled ... this is exactly the claim of ecological modernisation* (Dryzek 1997:1136).

To achieve the maintenance of current systems but promote environmental care, a radical transformation is not required. EM:

> *implies a partnership in which governments, businesses, moderate environmentalists, and scientists cooperate in the restructuring of the capitalist political economy along more environmentally defensible lines* (Dryzek 1997:144).

So far, so simple. But there are complications. When used by academics as set of theoretical tools for explanation or policy analysis, the aim is to identify ecologically inspired change. The difficulty with this is that change can be viewed across multiple dimensions and thus:

> *...[EM] can be used descriptively, analytically or normatively* (Christoff 1996:480).

Because it can have these different applications, and each may observe strong and weak elements, there are issues 'relating to the relationship of the term to its ecological and modernist references' (Christoff 1996:476).

'Modernisation' refers to a process of change toward the modern (embracing the sciences, technologies and economic growth). The 'ecological' refers of course to the science of relationships between organisms and their environments, and specifically the interdependence of living organisms in the environment. By implication, use of the term 'ecological' often implies 'ecosystem' and the corresponding succession of orderly and interrelated observable patterns of change. Among the various sciences multiple forms of ecological study exist, in which the common thread is interrelationships in some form or other with habitat. In sociological terms, human ecology pertains to analysis of human groups and their physical and social environments. Ecology is often used to denote impacts of humans on the environment, or protection of the environment from human effects, usually with the implicit intention of rectification through conservation, or prevention through precaution. In the case of EM, the 'habitat' is principally the global capitalist economy and its constituents are member countries of the Organisation for Economic Co-operation and Development (OECD).

EM has developed as a theoretical discourse seeking to transcend the polarised debate between the 'limits to growth' (often considered a government responsibility) and the 'business-as-usual' (largely commerce and business) positions regarding environmental management. The 'precautionary principle' and advancing environmental technologies are central tools of EM for both industry and government, in that the former delivers the policy of limiting ecosystem change, and when combined with the latter, continued production and economic growth is enabled. Indeed, EM theorists see 'environmental protection as a... potential source for future growth' Weale (1992:76) and competitive advantage. To assess this potential, it is therefore necessary to have a framework of analysis that identifies how core entities such as governments and corporations are responding to environmental problems. This involves study of political and economic institutions, consumer behaviour, and the role and impacts of social movements.

EM theory thus presents a framework for analysing the ways in which contemporary industrialised societies deal with environmental crises (Mol and Sonnenfeld 2000:2). It is a discourse analysis of the:

> *... dynamics of environmental conflicts in society and how policy making evolves in response [to]* ***recognising****... ecological crises as evidence of a fundamental omission in the working of the institutions of modern society [and]* ***suggesting****... that environmental problems can be solved in accordance with the workings of the main institutional arrangements in society* (Hajer 1995:3 emphasis added).

By implication, EM assumes that governments are capable of learning an environmental discourse, the quality of which is dependent on how environmental conflicts are recognised, or chosen for recognition. Added to this, EM suggests that solutions can be found to environmental degradation in present global capital structures. It will be shown, however, that the ability to selectively acknowledge environmental problems, combined with the impulse to avoid real change; to stay with 'business-as-usual', can result in an apparent environmentalism that nevertheless does not guarantee environmental or public good stewardship. While EM holds that current institutional arrangements can deal with the environmental crisis it may not go so far as to acknowledge that in certain situations (such as in core/periphery economic relations) larger and stronger pressures may dictate the ecological agenda:

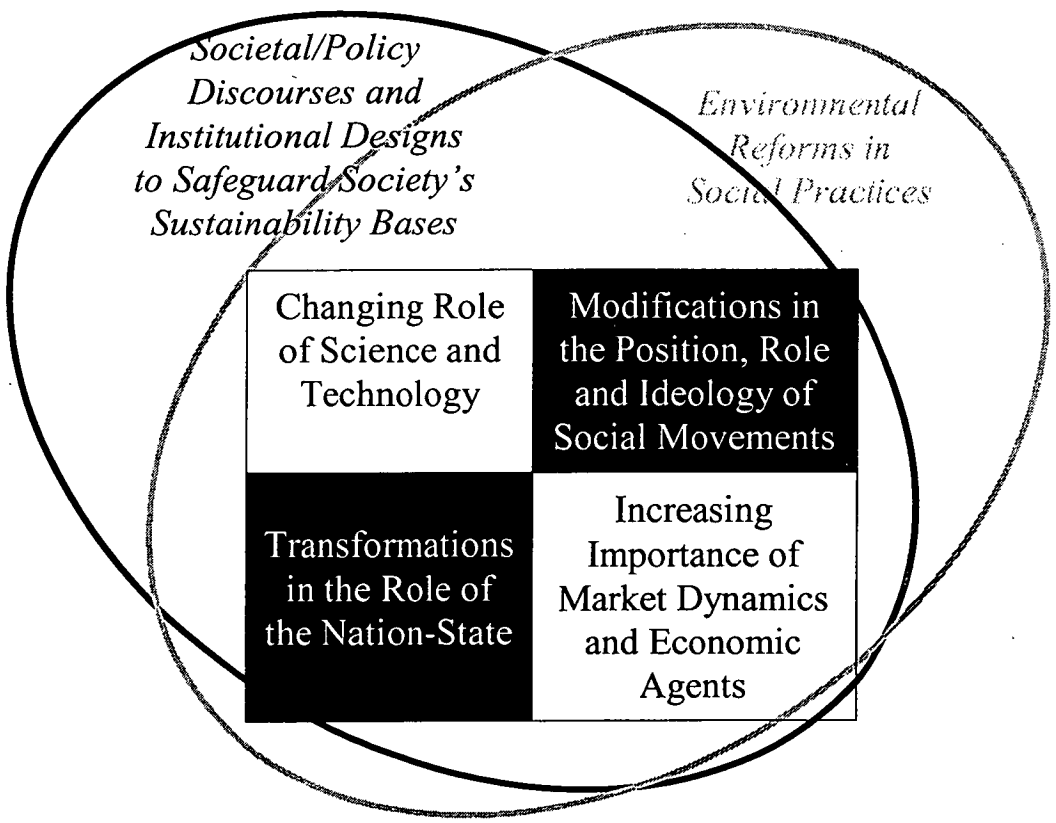
> *Though these features certainly shape preparedness for this policy program in important ways, they do not provide sufficient insight into the ability of individual nations to meet the rigorous requirements of ecological modernisation... countries exhibit considerable variation in their propensity to align their policies with strict rational reasoning* (Cohen 2000:1).

Mol and Sonnenfeld (2000) argue that ecologically modernised behaviour solves environmental problems in two key ways, both of which also have associated

elements. The first is concerned with social practices (the extent to which the ecological agenda is reflected in convention, behaviour, culture and consumer choice) and the presence of environmental reforms (particularly through the uptake of science, technologies and design which uses ecological criteria). The second considers the safeguarding of society's sustainability bases through institutional design and policy discourses. Figure 2.1 depicts Mol and Sonnenfeld's approach. Each element of Figure 2.1 can be studied in isolation as a single aspect of EM - a narrow reference to technological uptake and innovation, for example. More broadly, the combination of many or all aspects of the diagram is also valid, including reviewing ideological commitment to possible future scenarios of sustainable living.

FIGURE 2.1

CORE ELEMENTS OF ECOLOGICAL MODERNISATION



Source: adapted from Mol and Sonnenfeld (2000:2-6).

A central theme of EM is the need to understand and interpret the extent to which the key policy actors in contemporary capitalist political economies are responding to

environmental change. Rather than dealing with the environment as a discrete aspect of the economy which has to be managed, EM acknowledges the necessity to weave environmental management through all aspects of the political economy. This includes environmental performance as a competitive element in global markets, the market promoting positive environmental outcomes, the enthusiastic co-operation of industry, and the core maxim that sustained growth is dependent ultimately on restructuring along environmentally sound lines (Dryzek 1997:141).

A premise of EM is the continuing predominance of a global capitalist system in which profit, growth and wealth are core political and corporate objectives. EM seeks to identify and measure the multiple opportunities for environmental 'best-practice', with a view to influencing the accumulation of profit and the cycle of capital.

It is implicit in EM that, within the parameters set by global capitalism, change *can* occur (the modernisation component), and within the broad ambit of possible change, a central EM assumption is that political and economic actors and institutions are capable of social learning (Weale 1992). This context provides broad opportunity for the application of EM as a theoretical and analytical tool. Christoff (1996:476) argues that EM can be used conceptually in policy analysis to 'indicate deeply embedded and ecological self conscious forms of cultural transformation' (1996:479). It is important to add 'or not' to this statement, because EM allows for analysis of whether change is or is not occurring. The approach focuses upon explaining change in environmental practice and the development of environmental consciousness within the economy, where previous theories have tended to canvass environmental social movements and aspects of government performance. These differences in theoretical orientation aside, and 'notwithstanding their temporal, national, and theoretical differences, one can gather this scholarship together under the aegis of Ecological Modernisation Theory' (Mol and Sonnenfeld 2000:2).

Varied EM approaches reflect the broad opportunity it offers for analysis. It can be interpreted in a restrictive and environmental technology context and more broadly as a tool to define changes in environmental policy discourse. It can be a tool for retrospective commentary, or, as this thesis will demonstrate, as a context for critical

analysis of the extent of environmental change and of the limited opportunities some marginal economies may have to implement change. EM is not without its critics and these will be discussed in section 2.4.

2.2 Historical Background to Ecological Modernisation

Some eco-modernists claim that there has been a shift from the radical grass-roots conflict environmentalism of the 1970s and 1980s, to a more professional, reform and consensual orientation in the 1990s (Rinkevicius 2000). The latter constitutes the institutional environmental learning process noted above.

It is generally considered that Huber (1982, 1985, 1991) and Janicke (1993) were the first authors to use EM as a conceptual approach (Dryzek 1997, Mol and Sonnenfeld 2000). It can be argued that early contributions to EM tended to focus on the ability of economics to deliver environmental consciousness through product choice, efficiency in production and with varying degrees of state intervention (Huber in particular saw a greater role for the free market than for state intervention), whereas later contributions are concerned with more social and cultural aspects of environmental change (developed largely in response to the perceived narrowness of 'first wave', technology-driven EM).

Some commentators (Dryzek 1997, Hajer 1995 and Weale 1992) describe EM as emerging from a process of institutional change that embodies a sustainable development ethic of one form or another. This 'ethic' is most evidenced in developed countries (typically of OECD membership) with the pioneer country of EM usually identified as The Netherlands, and embodied in the National Environmental Policy Plan 1989 (NEPP). Hajer's viewpoint:

> *The UN report* Our Common Future *(1987), which became the centre piece of the environmental debate in the late 1980s laid the conceptual foundations for environmental politics in the1990s... Western countries published comprehensive documents outlining national environmental*

policy plans ... carefully... reflecting... the perspective of 'sustainable developed' as proposed... (1995:9).

Boland (1994:136) suggests that national or state policy plans such as the NEPP emerge to institutionalise policy long-sightedness, environmental protection beyond technological treatments of waste at the end of pipes, and the need for a series of environmentally relevant policy goals identifying causes of environmental harm throughout all aspects of economy and society, as opposed to seeing the environment as discrete. EM came into being as a result of theorists observing the emergence of such policies.

2.3 In defence of Ecological Modernisation's claims and ideals

EM, in all its possible guises, acknowledges the infiltration of ecological ideology throughout all aspects of contemporary global capitalist economies. In principle, it can be said that there are three main aspects to EM as a policy and analytical paradigm:

(i) *moving beyond apocalyptic orientations to see environmental problems as challenges for social, technical and economic reform, rather than as immutable problems caused by industrialisation;*

(ii) *emphasising transformation of core social institutions of modernity - be it not beyond recognition - including science and technology, production and consumption, politics and governance, and the 'market', on multiple scales (local, national, and global); and*

(iii) *positioning in the academic field distinct from counter-productivity/ deindustrialisation, postmodernist/strong social constructionist, and many neo-Marxist analyses* (Mol and Sonnenfeld 2000: 2).

In light of (i) in particular, and despite the criticism which will be outlined in the following section, EM is the most comprehensive attempt to describe the capability of contemporary, western political economies to institutionalise ecological values and adopt environmentally benign patterns of behaviour. The common academic critique

of EM is that while it provides a tool for assessing the extent to which sustainability is incorporated into current policy, management and production, it lacks the ability to assess the degree to which this translates into actual substantive change in what is done and the way it is done. Moreover, it fails to provide an understanding of the underlying motives behind the incorporation of sustainability into modern society. That is, it cannot answer the question of whether this adoption of sustainability is driven by a fundamental shift in societal values, or whether it represents a more simple technological fix that is consistent with, rather than conflicts with, the dominant economic paradigm. *It is this failure of EM however, that makes it useful at the academic level*, because it provides a starting point from which to answer that precise question - whether this environmental rhetoric translates into a) environmental improvements and b) to what extent this is driven by a value shift in the way people think about the world as opposed to an adaptation of modern industry and government as a means of self-perpetuation - a doctrine of reinforcement.

EM does however recognise difference in geographies, economies, nation states, and industries. It caters for difference by recognising a spectrum of strong and weak ecologically modernising aspects in a way that also facilitates comparative analysis. EM provides an opportunity to observe that:

> *... even if capitalism's ecological crisis is not about limits to growth, it is certainly about the limits to growth via ecological plunder. This has swiftly brought about new appreciation for the shared conditions of life. Awareness of ways that social life is embedded in the wider web of ecosystems leads away from the 'contractarianism' of classical liberalism.* (Boland 1994:138).

The capacity to distinguish between weak and strong versions of EM does allow the observer to obtain a picture of whether the adoption of sustainability and related concepts is relatively minor, or whether this adoption of sustainability has been more thorough and widespread. Hajer (1995) picks up on the strong and weak dimension with parallel *Techno-Corporatist EM* (managerial implementation and technical environmental solutions) and *Reflexive EM* (an approach based on critical self

awareness – an environmental ideology). A more reflexive EM society, in Mol and Sonnenfeld's (2000) terminology, includes actual and potential capacities for preventing and rectifying environmental harm; consensual style governance as opposed to top-down national command and control regulation; involving social movements in governance as opposed to limiting them to the periphery; and acceptance that a compartmentalised understanding of the environment and economy is no longer acceptable. Dryzek likens the techno-corpratist approach to sustainable development as 'a discourse of reassurance'(1997:146) because it can result in little more than a commitment to 'business-as-usual'. His point is that EM tends to become merely a tool with which to analyse the rhetoric of political and economic institutions. This paper will demonstrate that the ability to do this is informative and not necessarily a deficiency.

Many authors argue that multinational corporations have become increasingly adept at pacifying concern over environmental management and performance in business, whilst at the same time becoming increasingly capable of avoiding social and environmental equity issues in their operations. An example is petroleum giant Shell, which, as described by Braithwaite:

> *... has become extremely proficient at side-stepping concerns over its operations. At the same time the company has attempted to win over the public by establishing its own criteria for sound practices (while rejecting independent monitoring) and engaging 'stakeholders' on its own terms... In an attempt to mollify critics, industry has adopted the language of environmentalism, resulting in the flourishing of greenwash...* (1999:1).

Welford argues that industrial companies such as Shell respond to the pressures of criticism by attempting to ensure that they determine the shape and direction of any new agenda. The dominant ideology of corporate environmentalism according to Welford is EM, '... and within that is the tool of eco-efficiency' (1997:3). Dryzek identifies five main elements to ecologically modernising business and these also describe characteristics of eco-efficiency:

(I) *'less pollution means more efficient production';*

(II) *future solutions may be more expensive than prevention in the first instance;*

(III) *an unpolluted and aesthetically pleasing environment means a healthier, happier and more productive workforce which may even happily sacrifice wages and salaries for these environmental awards;*

(IV) *'green goods profit'; and*

(V) *'pollution prevention profits'* (1997:142-150).

Each of these five elements has the potential in an ecologically weak modern society to 'defuse the radical potential of environmentalism and deflect the energies of green activists without significantly changing the political economic system' (1997:142-150). Businesses therefore promote the EM agenda because it requires little real change or ensures no change need occur at all. EM does, however, provide a means to decipher the meaning and extent of real change, thereby providing opportunity for critical debate and reform. It can be simultaneously an excuse for inaction and a valuable tool for critical analysis of that inaction.

EM shows how 'social constructivism and discourse analysis add essential insights to the analysis of contemporary politics' (Hajer 1995:3). Critics such as Dryzek assert that the conduct of strategic public relations exercises may be cynically aimed at capturing community and public support, and likewise, defenders of EM highlight this as an attractive stance for politicians. More elaborate environmental management strategies include sponsorship of a variety of public relations exercises, award and performance functions, NGO groups, and some government initiated programs. The most critical scholars of EM describe this process as a discrete form of brainwashing so as to quell possible criticism. Arguably this form of sponsorship can help structure a basis for growth where monies spent correspond with return on investment. This paper asserts that EM both recognises this process and facilitates analysis of it, by providing the means for analysis of specific economies and of the feasibility of the 'environmental reform trajectory' it hypothesises. To effectively apply EM however,

in order to outline feasible opportunities (or not) for environmental reform within the context of specific local conditions, EM requires refining to fit specific local conditions and institutional developments (Frijns *et al* 2000).

> *Together, such technological/material objectives, mechanisms and institutional dimensions of ecological modernisation provide a useful starting point for evaluating the applicability of the theory to particular cases* ... [and] *analysis addresses two questions: to what extent have* [particular activities or behaviours] *'ecologically modernised' in recent years?* [And] *how have these changes taken place* (Sonnenfeld 2000:237)*?*

EM thus provides a basis from which to explore ecological crises at a level beyond the constraints of dominant socio-economic institutions, thereby stimulating the development of 'deeper' ecological theories.

2.4 Critics of Ecological Modernisation

> ... *competing definitions blur* [EM's] *usefulness as a concept. Does ecological modernisation refer to environmentally-sensitive change? Does it more broadly define a style of policy discourse which serves either to foster better environmental management or to manage dissent and legitimate ongoing environmental destruction? Does it, instead, denote a new belief system or systemic change? Indeed, can it encompass all of these understandings* (Christoff 1996:476)*?*

While it can be seen that EM can mean many things, both its advocates (those concerned with *prescription*) and those who adduce evidence of its actually occurring (those concerned with *description*) can be separated into two groups, and within these two groupings, three specific contexts can be separated and grouped again.

Concerning EM as prescription, first there are those who use EM as a basis for analysing social transformation by comparing and contrasting cultural changes with regard to the environment. This includes analysis of such indicators as consumer preference and the presence and level of activity of non-government environmental organisations. As Christoff says, 'EM is used conceptually in policy analysis to indicate deeply embedded and ecologically self-conscious forms of cultural transformation' (1996:476). Second, while still using EM as an analytical tool, there are those who focus on interpreting the social relationships within contemporary environmental reform processes. Third, there are authors such as Weale who discuss industry and government in their capacity to change the environmental trajectory through uptake of green technologies and pressures of the free market (in the case of industry), and regulation and policy goals (in the case of government). These differences evidence the major strains within EM's application as an academic tool.

Before turning to EM as descriptive of 'real-world' developments, it is useful to refer to Dryzek's summary of EM as a discourse. Dryzek outlines four core assumptions that undermine its utility to promote sound environmental outcomes. He summarises 'discourse analysis of ecological modernisation' and the underlying assumptions of each category thus:

(I) *Basic Entities are Recognised or Constructed*
- Complex systems
- Nature as waste treatment plant
- Capitalist economy
- The state

(II) *Assumptions about Natural Relationships*
- Partnerships encompassing government, business, environmentalists, scientists
- Subordination of nature
- Environmental protection and economic prosperity go together

(III) *Agents and their Motives*
- Partners; motivated by public good

(IV) *Key Metaphors and Other Rhetorical Devices*

- Tidy household
- Connection to progress
- Reassurance

(Source: Dryzek 1997:146)

As prescription and description there are multiple types and varying degrees of adherence to EM; similarly, there are parallel critical positions ranging from the teleological to the rational economic. One can, however, arrange the foci of criticisms of EM as description into three broad categories. For simplicity we can amalgamate Dryzek's third and fourth categories, as both pertain to learning and knowledge, how these are used, and the motives behind decisions and policy. I deal with each in turn and will refer to them as:

- *Group 1: Holism* (EM is seen to lack a holistic view of the world, a 'depth' perspective, or intrinsic values);
- *Group 2: National Reform Agendas* (the claim that the existence of governmental policies which pertain to sustainable development constitutes evidence of EM occurring, is held to be a view which fails to recognise implementation deficits); and
- *Group 3: Knowledge of the Environmental Reform Trajectory* (the assumption is that governments and other change agents are capable of learning, but the critics maintain that even if they do learn, this does not imply positive reform or that knowledge gained will not be used to subvert its own intent - a combination of Dryzek's third and fourth points).

From group one emerges the most forthright criticism of EM - that, fundamentally, environmental sensitivity cannot be supplied by capitalism. EM as an analytical tool, for interpreting the reform agenda, is held to lack a holistic view of the world (see Dryzek 1997, Christoff 1996). In particular, it lacks a capacity to embrace intrinsic, non-economic intangible values. EM can also be criticised for not having any real

substance, in that it can be used simply to describe the re-tooling of industry in a pollution-reducing context, which is certainly good for the environment, but which:

> ... *can view natural systems in only limited terms, as mere adjuncts to the human economy. Nature is treated as a source of resources and a recycler of pollutants... this limited view of nature warrants green radical suspicion...* (Dryzek 1997:144).

Fuelling this suspicion are the state of the art 'technology fixes' of modern production systems, where:

> ...*the stress upon setting emissions standards implies a focus on effects rather than causes and hence a focus on end-of-pipe solutions. We should not expect a great deal of emphasis, then, in policy discourse on the need for structural changes in production and consumption to reduce pollution* (Weale 1992:84).

It can also be argued that resource extractive economies such as Australia, dictated to as they are by global commodity prices, are unable to achieve the far-sighted holism to which strong, reflexive EM aspires. The momentum which drives an integrated economy in a given direction cannot so blithely be shifted. In such polities, government is essentially constrained to maintaining social and economic progress – and EM becomes a discourse of reassurance (Dryzek 1997).

The second group of criticisms of EM as description highlights problems with the deficiencies stemming from its having evolved through the observation of national reform agendas, and the assumption that these are evidence of environmental care. This is problematic, particularly when reform agendas are not translated into real change or result in the transfer of old industrial processes to newly industrialising countries (Christoff 1996:487). Hajer (1995), Weale (1992), Dryzek (1997) and Boland (1994) each note that evidence for EM occurring can be found in national sustainability strategies. However, many strategies fail (often dismally) on the ecology front because often they are expressed as instruments of intention rather than

regulatory change, and the fact that nothing concrete is required to be done can result in ecological reform implementation deficits. Where some converts to EM might suggest that the primary function of governments is to set the policy and regulatory scene to achieve the internalisation of ecological values, this position suffers the contingent risk of 'nothing being done about implementation deficits', and it further assumes governmental autonomy over and above processes of globalisation. In the case of the Dutch NEPP, heralded as the paragon of successful EM, '... even with the full application of existing end-of-pipe technologies it would not be possible to prevent a decline in environmental quality in the Netherlands' (Weale 1992:134).

Turning to the third EM-as-description group, which refers to the learning of environmental discourse and the core aspects of EM as presented by Hajer, the assumption that governments will recognise elements of environmental crises and respond through appropriate discourse is criticised as potentially naive. Even when perceptions may seem to change in the most profoundly ecocentric ways, this will not necessarily be translated into real action or policy change. Institutional rhetoric and ideology has multiple and potentially conflicting functions. Both as theory and doctrine, EM can be viewed as ideology or as an analytical tool used for a variety of reasons. Without clarification 'there is a danger that the term may serve to legitimise the continuing instrumental domination and destruction of the environment' (Christoff 1996:476). This view is even endorsed by proponents of EM such as Hajer, who acknowledges that national and global policy papers such as the World Commission on Environment and Development's (WCED) *Our Common Future* (The Bruntland Report) can be seen as a way of pandering to core economic development institutions such as the World Bank and the International Monetary Fund, both of which have since become 'central agencies for the monitoring of green policies all over the world, and rather than this being heralded as a success of environmentalism, it set the death-knell of collapse' (1995:12).

Further, Dryzek (1997) suggests that in many instances the extent of ecosystem damage in a given country can be shown to be a positive EM force. This is because when biophysical decline results in general decline in standards of living, the need for environmental reform is more obvious; and change for the better can be lauded as

impressive evidence that EM is working, when in fact all that is occurring is that recently lost ground is being recovered, and an early, still unsatisfactory equilibrium restored. Dryzek also argues that consensual or corporatist political-economic interrelationships do not in themselves guarantee a concern for environmental values (1997:14), principally because statements of intent and principles of precaution can simply be rhetoric. Indeed, consensus can result in greater ecological decline especially where the primary motive is that of short-term wealth generation, for which issues such as the environment may be commonly agreed to be obstructive. Dryzek uses the metaphor of the 'tidy household'. Governments and perhaps societies generally seek to maintain a level of affluence that seems to correlate with orderliness:

> *For the implicit metaphor in ecological modernisation... is that of a tidy household. This household is concerned with maximising its wellbeing, but at the same time realises... surroundings contribute to the household's sense of wellbeing... it is not surprising EM has prospered most in countries noted for the tidiness, prudence and far-sightedness of their households... EM is a discourse of reassurance, at least for residents of relatively prosperous developed societies...*
> (Dryzek 1997:146)

Though Dryzek quite rightly points out that assumptions about the compatibility of modernity and nature, and economic development and public altruism, are combined with rhetorical devices to reassure the rightness of business-as-usual, this dissertation will nevertheless demonstrate that these elements can be used as a basis for analysis of 'clean green' economies or political behaviour. EM provides a context for assessing the extent of greenness through comparing different behaviours, or providing a starting point to assess specific behaviours. Indeed, Dryzek admits that EM has a much sharper focus than does sustainable development on exactly what needs to be done with the capitalist political economy, especially within the confines of the developed nation state, because:

> *Unlike sustainable development, economic redirection does not necessarily require a de-emphasis of the state and concomitant*

promotion of international society and the political grass roots (1997:144).

Finally, whilst Christoff suggests that because EM can be used descriptively, analytically or normatively this weakens it as a conceptual framework (1996:480), it is submitted here that what EM does deliver is a paradigm suitable for observing change and assessing commitment to an environmental agenda. Other ecological theories (particularly those of the deindustrialist persuasion), wherein the possibility of radical environmental reform is deemed impossible under capitalism, fail to achieve this.

2.5 The Utility of Ecological Modernisation to this Thesis

Reinforcing Dryzek's view that, while problematic, EM does have some discourse analysis utility, Hajer (1995:17-20) identifies five core tendencies in the way western society relates to its environments: humans will continue to view the environment as a source of material wealth and consumption; environmental change is universal but the way humans relate to the changing environment is culturally predetermined; in western globally oriented economies there is a tendency to conceptualise the environment romantically and as the antithesis of industrialisation; observation of western economies over the past four decades is characterised by particular iconic environmental events; and finally, the politicising of environmental decline comes about only as a result of levels of greenness that are learned in the community, government and industry, and are thereby questioned or promoted. This thesis will primarily focus on the latter by questioning the nature of the greenness promoted by government; that is, if a sustainable rhetoric was not available to the Tasmanian government, would economic development and its supporting policies be in any way modified (the question runs) in an ecologically informed direction.

Hajer's fifth element of environmental discourse acknowledges that discursive strategies have a key role; environmental bad practice and environmental disasters only become political if they are conceptualised in environmental discourse. Theoretical approaches to EM differ widely, depending on the degrees of greenness

held by theorists themselves, which can lead to differing interpretations of elements of governmental discourse. Objectivity eludes. The remainder of this paper will explore the ambiguity of 'greenness' and the uptake of paradigms such as sustainable development, particularly in a greenhouse sense.

While Dryzek criticises EM for not guaranteeing the priority of environmental values within policy formulation, the utility of EM can be seen by highlighting the real environmental policy debt (in other words, the extent of greenness) in institutional politics. In Tasmania two core government-based institutions have historically dictated economic and political arrangements. These institutions have managed forest and hydro-electric power and have, through various restructures, eco-modernised, presenting themselves as market-responsive, independent and competitive 'clean green' economic units. This is in stark contrast to their behaviour in the 1970s.

There is decreasing scientific contention over the threat of global warming and the greenhouse effect. Greenhouse has become common language, much like sustainable development has become a core policy focus within any ecologically modernising bureaucracy. In Tasmania, industrial growth and energy/GNP relationships as a policy focus left over from the old ideology of hydro-industrialisation have been ecologically modernised to remain key policy foci, repositioned and regaining strength through appeal to a clean and green marketing advantage. Is this form of EM strong/reflexive, or weak/rhetorical? If greenhouse was to be fully embraced and the utility of hydro-electricity used to its greatest potential in Tasmania, a number of outdated energy intensive industrial processes might be replaced by smaller, more efficient and 'better job' businesses. Exploring greenhouse capability and the opportunity to exploit hydro-power generation and forestry potential within strong and weak ecologically modernising processes, will be undertaken to demonstrate the utility of EM as a conceptual framework.

The fact that the idea of reflexive modernisation was developed by sociologists such as Beck and Giddens in order to analyse individual and institutional strategic action, provides insight into an EM problematic, that of governments sometimes confusing the roles of institution and of corporate citizen. Particularly where government

agencies are privatised they often play the role of consumer, developer and environmental regulator. Campbell (1999) argues that in a competing free market system, where determination is through consumer choice rather than scientific truths, government can in different instances be consumer and corporation. Being both can confuse goals and strategies. This confusion can surface when investigating governmental rhetoric and advertising campaigns, which do not necessarily represent scientific 'wisdom' but instead play on cultural preference. The authenticity of the EM process can be challenged because consumer preference can be manipulated by new labelling of old goods. Thus contemporary environmental reform needs to be considered in light of perceptions of management strategies and information presentation by governments and business.

When government and/or its agencies are competing in the free market as semi-privatised entities, the key overarching role of 'government' as the 'body politick' arises from the need to continually re-evaluate and reinvent strategies to achieve ideological, often axiomatic, goals. This becomes a balancing act between competitive economic development and social and environmental obligation, the ultimate balance being that to which reflexive EM refers. Some would argue, for example, that privatisation is the purest and most straightforward means of achieving efficiency in the economy by leaving the cut-and-thrust decisions to private motives. While it may or may not result in more efficient economic growth, what it fails to consider are the social and environmental impacts. This is because not all environmental and social solutions can supplement overarching goals of profit. As a result, a 'not necessarily for profit' obligation is essential in government. Hence another dimension of perception/information management exists alongside the corporate, and this additional layer of complexity can defuse or deflect environmentally inspired citizen action:

> *The apocalyptic overtones in the presentation of global environmental problems seriously confines the political debate on what needs to be done, by whom, and under what conditions. Hence there is ample reason to examine in detail how the priority issues in environmental politics are defined, as well as trying to understand the implicit political decisions that are being made through environmental discourse* (Hajer 1995:11).

Using greenhouse as an environmental policy context, this paper will demonstrate the validity of this position. It will include understanding the development opportunities stemming from regulations that create a carbon constrained future and it will assess the political/policy decisions that are being made in this context – weak, in a top down, reactive and rhetorical sense, or strong and proactive, in a reflexive sense. The remaining chapters will thus explore elements of why, where, and how the Tasmanian government is attempting to exploit development opportunities with a renewable-industrialisation and greenhouse rhetoric as a core management strategy. The potential of Tasmanian public, private and natural goods to provide competitive advantages will be discussed, with particular emphasis on the pros and cons of various issues confronting consumers. Dilemmas such as greenhouse sinks in the form of plantations on cleared agricultural land versus maintenance of rural lifestyle values, consumer perceptions of solar power versus large and 'dirty old' hydro schemes, and marketing strategies such as *GreenPower,* will be used to support a core argument: that, while greenhouse provides an opportunity for businesses and government to appear to be ecologically modernising, in reality environmental intentions need to be questioned.

The remainder of the thesis will describe potentially conflicting goals and obligations and the policy opportunities the greenhouse model presents as a demonstration of the ecological modernisation of two key public utilities attempting to reinvent and legitimise themselves whilst aligning to economic policy assumptions which have remained constant for over half a century.

2.6 The Extent to which this Study Makes Sense of Ecological Modernisation as an Analytical Tool.

It has been shown that EM provides a basis from which to observe the industrial transformation of different economic sectors and the extent of state intervention in ecological reform. Observation of environmental management on the part of industry, consequences for employees, and changes in technological trajectories, enable

analysis of development opportunities and likely benefits to society. EM offers a means of analysing the discourse and thereby gauging the degree to which there is dissonance or concurrence between environmental policy-speak on the one hand and the actual drivers of policy on the other and whether this relationship is strong or weak.

This thesis makes sense of EM as a guide to identifying the extent of top-down policy pressure and resulting local policy debt/lag/awareness often communicated in a rhetoric which purports to be otherwise. This will be achieved by assessing the potential for extensive competitive advantage through Tasmania's contingent greenhouse position (significant carbon sinks, extensive use of renewable electricity and a clean green image) without major structural change. The case studies will explore how this contingency may or may not accord with reality. The likelihood of a match between what is likely to be real and what is conveyed will be shown to be excessively optimistic. Combined with this over-optimism, the paper will evidence both historical and contemporary policy strategies to identify the extent of strong reflexive or weak EM as they are demonstrated through changing discursive practices and emerging new ideologies couched in greenhouse discourse. It is likely that Tasmania's greenhouse policy position will reflect that found in one aspect of Finnish policy:

> *The findings on Finnish agri-environmental policy are somewhat contradictory. On one hand, especially in the policy discourses, there are signs of transition consistent with the ecological modernisation theory. On the other, from the institutional and practice-oriented perspective, the evidence suggests only some minor changes, even stability in agri-environmental regulation...* (Jokinen 2000:1)

As a case study greenhouse and the extent to which the Tasmanian government has accommodated a greenhouse rhetoric through two core environmental businesses arms that have been at the centre of environmental conflict will be explored. It does this in anticipation of Hajer's question, is EM essentially rhetorical purporting to reconcile the irreconcilable (environment v development) -

... only to take the wind out of the sails of 'real environmentalists' ... or a much more profound meaning [that] *could be seen as the first step on the bridge towards a new sort of sustainable modern society?... this openness makes EM the intriguing subject that it is* (1995:34).

3. Interpreting Greenhouse Credentials: a clean, green and ecologically modernised industry

This chapter explores what the environment industry is, more specifically examining the types of activities that can be considered to be 'greenhouse' oriented. It will include an exploration of the core elements of the Kyoto Protocol and greenhouse policy approaches in the United States and Australia. Critical to these policies are the industries that would be developed, and processes that would be changed, in order to put greenhouse strategies into practice. By identifying those activities that might comprise the 'greenhouse industry' this chapter will provide a foundation from which later chapters will interpret business capability and opportunity, as well as the competitive advantage and investment attractiveness Tasmania has to offer in a greenhouse context, and how this is becoming part of the government's environmental discourse.

3.1 Toward Defining the Environment Industry

The range of definitions of the 'environment industry' or 'environmental industries' is vast, and there is herein no attempt to be comprehensive. It is, however, useful to consider examples of how the environment industry has been defined in the context of our assessment of the greenhouse industry. This section draws upon the approach taken in the Tasmanian Department of State Development's (DSD) audit of environmental industries (Beckitt, Davies and Smith 1999).

There is no universally accepted definition of the environment industry. One view is that, technically speaking, the 'environment industry' does not exist (Statistics Canada 1996) - primarily because no formal statistical codes have been developed within environmental jurisdictions. Another view restricts the definition of the environment industry to limited and measurable activities that largely focus on waste, such as pollution control and resource management (Australian Bureau of Statistics). Yet other approaches define it more broadly. For example, the environment industry can

comprise 'industries whose activities make a positive contribution to ecologically sustainable development' (Crowley 1999). Definitions more narrowly confined to the management of waste, pollution, energy, environmental monitoring and other services also exist.

The utility of exploring definitional issues resides in the need to establish a basis from which to benchmark and compare environmental performance (or green credentials) based on relevant business activity. An aim of the thesis is to interpret 'credible' greenhouse based business activity, within the context of the observation that, if no (or even few) high-profile environmental businesses already exist within a regional economy, establishing green credentials can be difficult.

3.1.1 Statistical Constraints

It is very difficult to assess environmental performance; to benchmark (for example) levels of acceptable environment deterioration. In the first instance there are the inherent difficulties involved in measuring compliance and non-compliance with environmental legislation. Added to this, a myriad of environmental management tools have evolved, and their application and use frequency could potentially be measured. Environmental management tools, however, span local, state, national and international jurisdictions, and include such devices as: formalised International Organisation for Standardisation's (ISO) environmental management system ISO 14001 (an environmental management system designed for businesses to develop a systematic management approach to the environmental concerns/obligations of their organisation, which can then 'credibly' demonstrate to clients how the business is striving to effect positive environmental transformation in management); new Commonwealth corporations law (S 299(I) (f), which requires businesses operating under certain environmental permits and licenses to produce public environmental reports); and guidelines for the production of various State of the Environment and Impact Assessment Reports.

Because of this plethora of approaches to environmental management, setting in place a conceptual framework with adequate rigour for benchmarking performance poses

significant problems. Adding further complexity is the evolving nature of management tools and a characteristic lack of clarity on the precise nature and detail of performance requirements. Nevertheless, specific statistical approaches have been developed.

The Australian and New Zealand Standard Industrial Classification (ANZSIC) codes industry by variously determined categories. ANZSIC was developed (in part by the Australian Bureau of Statistics [ABS]) for the production and analysis of industry statistics in Australia and New Zealand (1993:1). Measuring business activity in those categories considered to be environmental activity provides an indication of the green credentials of businesses, regions or localities. Existing codes which are likely to cover the environment industry are:

- 3702 Sewerage and Drainage Systems Services
- 7821 Technical Services: Architectural Services (including landscape architecture and town planning)
- 7823 Engineering Consulting (including product design)
- 7829 Technical Services not elsewhere classified: including Pollution Monitoring and Scientific not elsewhere classified
- 7855 Business Management Services: including Environmental Consultancy (excluding laboratory services)
- 8113 Local Government Administration: Environmental Standards Control

The above categories can be inclusive of various environmental activities, while excluding others. Statistics Canada comments that:

> *This is not surprising because the environment industry consists of business involved in activities that span a number of different industries in the Standard Statistical Classification* (Statistics Canada 1996).

The ABS also has two broad environmental industry descriptors: environmental protection, and natural resource use and management. Environmental protection is

defined as 'that expenditure aimed at preventing, reducing or eliminating environmental pollution or any other degradation of the environment'. Natural resource use and management is defined as 'expenditure relating to the use and/or management for economic or social purposes of natural resources, including land, water, flora and fauna, sub-soil assets and energy' (Dyass, pers comm, 1999; see also ABS 1998b).

The ABS publication *Environment Protection Expenditure Australia 1995-96 and 1996-97* notes definitional difficulties in this area and in an attempt to strengthen the possibilities for international comparison has applied the key environmental domains provided within the European System for Economic Information on the Environment (SERIEE):

- waste management;
- waste water and water protection;
- ambient air and climate protection;
- protection of biodiversity and landscape;
- protection of soil and groundwater; and
- other environment protection activities.

The last of these domains, the 'other' category, constitutes an implicit difficulty with environmental activity. The ABS describes other environmental protection activities as 'those activities that are either not covered by the other domains, or those expenditures that cross over two or more domains and cannot be split' (1998b:58).

The categories developed by the International Business Information Service (IBIS) also present difficulties when it comes to narrowing down environmental activity to specific statistical classifications. IBIS business reports canvass the environmental industries in a roundabout way, via the following categories that may include components of the 'environmental industries':

- Technical Services;
- Business Management Services;

- Architectural Services;
- Sewage and Drainage Services; and
- Consulting Engineering Services.

3.1.2 A Broader Approach

The DSD (1999) audit of environmental industries notes that the Organisation of Economic Cooperation and Development (OECD) has attempted to establish a working definition of the global environmental goods and services industry, whilst also noting that 'the boundaries of the industry are blurred and not easily defined' (1993:3). Central to the debate is the differentiation between activities that clean up existing processes and production (end of pipe devices, for example, smoke stack filters), activities that 'reduce the need for clean up and end of pipe treatment', and activities which focus on 'clean technologies and products' (such as renewable energies) (OECD 1996a:4). The differences between these activity types underpin the 'greenness' and, therefore, the green credentials of business. In an EM sense, an observation of weak greenness may be evidenced by technology add-ons to business-as-usual which simply suffice environmental obligations, as opposed to more strong or reflexive approaches such as redesigning an entire business process from the bottom up to systemically engender environmental responsibility.

After extensive consultation the OECD produced an indicative list of activities which are likely to comprise the environment industry (Appendix 1). At the broadest level of definition core and non-core activities are as set out in Table 3.1.

TABLE 3.1

OECD BROAD LEVEL CORE AND NONE-CORE ACTIVITIES

CORE activities	NON CORE activities
A. Environmental Goods *Production of equipment, technology and specific materials for:* 1. Air pollution control 2. Waste water management 3. Solid waste management 4. Remediation/cleanup of soil and water 5. Noise/vibration control 6. Environmental monitoring, analysis and assessment	**A. Environmental Goods** *Production of equipment, technology for:* 1. Potable water treatment 2. Other recycling systems 3. Renewable energy plant 4. Heat/energy management 5. Cleaner/efficient processes 6. Cleaner/efficient products 7. Alternative agriculture/fisheries 8. Sustainable forestry 9. Others
B. Environment Services *Provision of services for:* 7. Air pollution control 8. Waste water management 9. Solid waste management 10. Remediation/cleanup of soil and water 11. Noise/vibration control 12.Environmental contracting/engineering 13. Environmental research and development 14. Analytical services, data collection and analysis 15. Environmental education and training, information	**B. Environmental Services** *Provision of services and construction for:* 10. Other recycling/recovery plant 11. Renewable energy plant 12. Amenity/conservation 13. Alternative agriculture/fisheries 14. Sustainable forestry 15. Eco-tourism 16. Other services (e.g. industry associations)

In its interpretation and application of the OECD definitions DSD used the framework outlined in Table 3.2. Tasmanian environmental businesses consulted by DSD during the audit process tended to support the above framework. Very few of these businesses required placement within the 'other' categories (A 9. and B 16. in Table 3.1), and those that did suggested very specialised activity. What is interesting for this thesis is that production of equipment and technology for renewable energy plant and sustainable forestry are considered non-core under the OECD definition.

TABLE 3.2

DSD ENVIRONMENTAL INDUSTRIES

1. Engineering Based Technologies to Aid Environmental Management

- Pollution control/equipment manufacture
- Process simulation, modelling, design and optimisation, e.g. buildings energy performance modelling, industrial heat flow modelling
- Process monitoring and control
- Logistical analysis and control systems
- Information technologies
- Biotechnology, e.g. for waste treatment and pollution control
- Materials science

2. Energy Conservation and Renewable Energy

- Energy efficiency in buildings: insulation, high-efficiency boilers, low-energy lighting
- Energy efficiency in equipment, e.g. variable motors and drives
- Carbon sinks and emission trading (forest related)
- Public transport
- Infrastructure for cycling, walking
- Landfill gas recovery
- Renewable energy (1): wind, hydro, solar, possible tidal and wave
- Renewable energy (2): biomass, including energy, forestry, waste incineration and digestion.

3. Management Tools/Consultancy Services

- Environmental impact assessment
- Environmental auditing and management systems
- Environmental accounting
- Life cycle analysis
- Environmental Planning/Policy/Legislation
- Environmental Risk Assessment

4. Waste Management Related

- Repairing and reconditioning
- Dismantling, reclamation and parts exchange
- Collection, transport and sorting infrastructure for re-use, refilling and recycling
- Reprocessing and recycling of waste materials
- Waste heat recovery and re-use, both within processes and, for example, horticulture and district heating
- Renewable materials, e.g. natural fibres and timber substitutes for plastic, e.g. hemp

5. Other Environment Protection Activities

- Research and Development

Source: Department of State Development (1999:21-22)

These categorisations illustrate the interconnected nature of the environment industries. They are also applicable to the search for a definition of the greenhouse industry, and for a framework which gauges green credibility.

3.2 Green Development: Green Jobs, Work and Opportunity

Because of the difficulties in establishing the boundaries of what constitutes the environment/green industries, there is a variety of characteristics adduced to influence policy and planning in government. One of the key drivers for development in our economy is the creation of jobs. This thesis seeks to explore development opportunities arising from greenhouse. Contemporary thought on green jobs can further help establish what development opportunities greenhouse presents, and the green credentials of a 'greenhouse industry'. The argument is that if a valid conceptual framework can be extracted from something as abstract as 'green work', a valid descriptor of what constitutes a 'greenhouse industry' can be far more easily actualised. This is because science and policy establish quantitative boundaries which delineate the 'greenhouse effect' and corresponding policies to mitigate it. In contrast, describing green work leads one into more qualitative/perceptual theoretical realms. Discussion of the latter also contributes to this dissertation in that evaluating ecological modernisation and assessing 'good' environmental stewardship often resides in perception management and attitudes concerning what constitutes real ecological reform.

In discussion of 'green jobs' programs from Australia and Denmark, Penny (pers comm, 1999) suggests five key areas of hindrance within general economic development in advancing the green jobs model:

I. an increasing class of people who are excluded from paid work because the nature of available jobs is unhealthy, environmentally destructive, or otherwise unsatisfying (for example, an individual committed to furthering environmental stewardship within their local community may be marginalised

because the only work opportunities exist in environmentally unsustainable businesses);

II. a need to restructure human economies and communities to stop damage to ecosystems;

III. (I) and (II) often impact negatively upon one another (a satisfying job may not be eco-friendly and visa versa);

IV. 'good' jobs and environmental protection are often seen as antagonistic, historically evident in environmentalist/union conflict; and

V. lack of integration between policy areas and of organisational collaboration. It is evident that many organisations and government agencies are working on finding solutions to employment problems which move towards sustainability but are not in touch with one another.

Further, Penny notes that employees generally do not evaluate the characteristics which are relevant to defining a 'green or brown job', but confine their interest to criteria accepted as defining a 'good job', such as an attractive salary. But elements that comprise a 'good' job are often not confined to financial return and working conditions. Penny's research highlights the solidarity and comradeship attached to mining jobs even though many mines may be operating with outdated technologies and production processes, be dirty, dangerous, and even be inappropriate in light of new technologies, resource depletion and climate change. The 'good job' perception must be addressed in attempting to restructure working populations and work practices. A greenhouse friendly job may not necessarily be a 'good job'.

These issues suggest a further obstacle to defining precisely what green jobs are: there is a considerable difference between using the 'process' whereby products are made as the determinant of a green job, and using the environmental soundness of the 'end-product' as the assessing criterion. From each perspective wildly conflicting results emerge. It is entirely possible to maintain that scrubbing dirty emissions is not a green job. An 'end product' approach will suggest that a photovoltaic cell is a green product, though the manufacture of the steel frame which holds the cell is not. Similarly, such an approach suggests that cleaner production implemented in a factory whose end product is a styrofoam cup is not necessarily green work (Penny, pers

comm, 1999). People in a production line involved in cleaner production processes, on the other hand, would be classified as being involved in green jobs if the criterion is not the environmental worth of the end product but the environmental quality of the production process, and this would be so regardless of the environmental value of the end product.

Penny suggests a further example: public transport and associated infrastructure which are not included in a definition of green jobs. The end product of public transport is moving people from one place to another and is not, on the face of it, discretely environmental, yet most people do adjudge public transport as 'environmental'. This problem becomes more complex when extended down to the micro-level of transport. For example, how are we to categorise these cases?

- A train driver may burn massive amounts of fossil fuel to transport goods and people from A to B, but arguably reduces the number of smaller vehicles being used.
- A road construction worker may burn massive amounts of fossil fuel to construct, prepare and enable the greater utilisation of more smaller vehicles, but potentially with greater efficiency and lower congestion than previously.

Each of these examples has to be viewed in terms of what the alternatives would be in the context of the local environment, of available capital/technology and of the ultimate choices made relative to business-as-usual (this will be evidenced in the Tasmanian case study of 'renewable industrialisation opportunities' in Chapter 5). (Interestingly enough, the definition framework adopted from the OECD in section 1.2 includes public transport and infrastructure such as walking and cycling tracks as environmental.)

The crucial issues presented by the green jobs debate that can add value to this paper rest in how governments and society perceive and value production. The pursuit of greenhouse related jobs will not add value to the Tasmanian economy if value is not placed on the importance of the work. Employment opportunities need to be understood in parallel with Tasmania's natural competitive advantages so as to

develop systems of production which maximise potential for growth in social, environmental and economic terms.

3.3 Defining the Greenhouse Industry

Discussion so far has outlined the difficulties in conceptualising and defining the environment industry and green jobs. This discussion is directly transferable to the notion of a 'greenhouse industry', which is a subset of the environment industry. It is, however, necessary to outline the characteristics which differentiate greenhouse activities from other environmental industries more generally. Once these characteristics have been established an exploration of greenhouse opportunities in Tasmania can be undertaken. Also needed is an analysis of concepts relevant to the uptake of environmental responsibility, environmental marketing and environmental competitive advantage. This will include debate on external and internal drivers within the greenhouse industry.

The central driving force for the greenhouse industry is the Kyoto Protocol, adopted by parties to the United Nations Framework Convention on Climate Change (UNFCCC). The Protocol established several differentiated levels of commitment to emissions reduction in highly developed (Annex B countries) countries (it should be noted that Annex B and Annex 1 tend to be used interchangeably, though, the list of countries in Annex B of the Kyoto Protocol differs from the list of countries in Annex 1 of the UNFCCC by the addition to the latter of Croatia, Liechtenstein, Monaco, and Slovenia and the removal of Belarus and Turkey). At the general level parties agreed to greenhouse gas abatement to at least five percent below 1990 levels for the first commitment period of 2008-12, though Australia managed to negotiate an eight percent increase, and Iceland and Norway also negotiated increases (see Figure 1). The Kyoto targets and flexibility mechanisms designed to achieve these targets have become key commercial and policy drivers for greenhouse industry development:

> *From an economic perspective the setting of greenhouse gas emissions targets in the Protocol was the key decision taken at Kyoto because of the significant potential economic and trade*

> *competitiveness implications they hold. Now that individual country targets have been set, the international policy debate has shifted toward the question of effective and environmentally credible implementation of the protocol... The Kyoto mechanisms are a number of important flexibility provisions contained in the protocol – emissions trading, joint implementation and the clean development mechanism – that, if implemented, could reduce the cost of meeting abatement targets* (ABARE 1999:2).

The flexibility mechanisms are intended to allow countries to develop customised methods for investing in emissions reduction, and to manage emissions accounts:

> *The Protocol sets up a checking account for each industrialised ("Annex B") nation, and deposits in that account five years of allowable greenhouse gas (GhG) emissions (for the 2008-2012 period). The amount of allowances for each nation is set as a percentage of the nation's 1990 emissions levels. Each nation commits to limit its emissions to the amount in its account. A nation emitting fewer GhGs than allowed will have surplus allowances; a nation exceeding allowed levels will have a deficit* (Union of Concerned Scientists 1998:1).

In order to explore greenhouse development opportunities recognition of these international mechanisms is essential. Nations will adopt technologies and develop economic and environmental instruments to comply with international incentives. In order to ensure that these opportunities can be captured in a technical definition, the thesis adopts a definition of the greenhouse industry that encompasses those activities which focus on reducing greenhouse gas emissions and on sequestering carbon through carbon sink development, by means of the activities/specialisations outlined in section 1.2:

- engineering based technologies to aid emission reduction and sink development;

- energy conservation and renewable energy to aid emission reduction and sink development;
- management tools/consultancy services to aid emission reduction and sink development;
- waste management to aid emission reduction and sink development; and
- other environment protection activities to aid emission reduction and sink development (including greenhouse gas measurement, Clean Development Mechanism and joint implementation initiatives).

Application of these criteria would likely see almost any activity included as a participant in the greenhouse industry. An exploration of greenhouse industry development opportunities therefore needs to take account of *local physical and economic geography*, as well as *local energy* and *emissions profiles, science, law* and *geopolitics*. The application of EM theory to analyse specific greenhouse discourse requires an understanding of the *quality and/or extent of various activities* within its geographic and *regulatory environment* in order that a *judgement of sink or abatement capacity* can be compared with alternatives, and quality of life indicators such as 'good' employment placed on the importance of the work.

Because the Kyoto Protocol has set individual targets for countries to meet, the policy impetus revolves around cost effective and environmentally credible implementation of the protocol (ABARE 1992:2) which should require economic and scientific rigour.

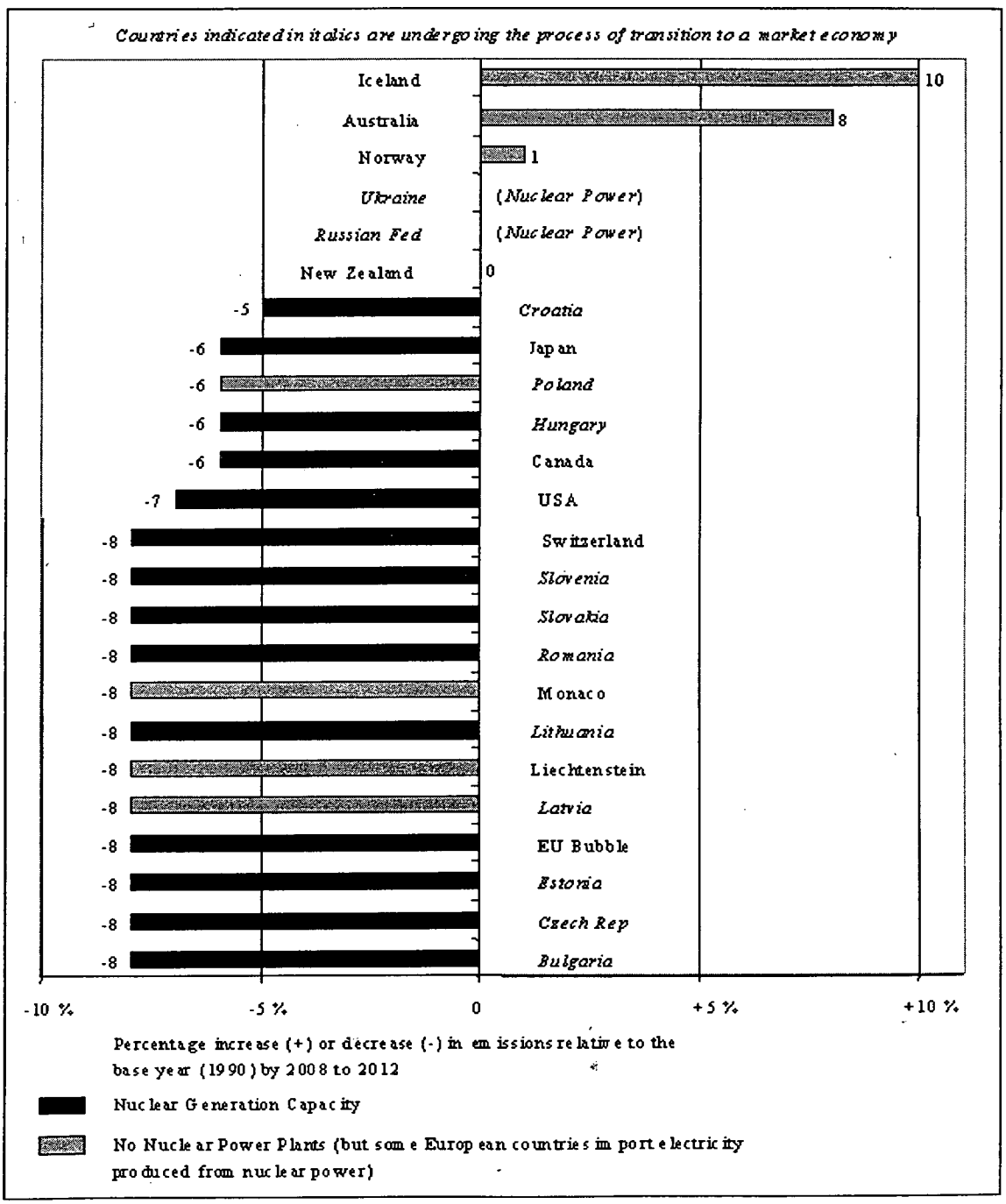
The following section therefore examines aspects of policy approaches in the United States and Australia that aim at greenhouse abatement. This will demonstrate the economic and development focus of the Protocol as the core influence on policy design, a fundamental characteristic that evidences EM in process. The policy approaches (and in particular the Australian approach) clearly illustrate that the guiding principles and courses of action reflect an accumulation of policy debt, particularly when considering their implementation and corresponding strategies.

Turning to the smallest Australian state, Tasmania, the trickle-down policy philosophy and its translation into on-the-ground development opportunities will be shown to be

little more than green rhetoric for governmental self-promotion, and evidence of weak EM. Where the Commonwealth is signatory to international treaties, ill-considered implementation methodologies can potentially undermine the original policy objectives. Policy decisions higher up the governance chain can promote implementation difficulties and prolong the accumulation of policy debt at the bio-regional level.

FIGURE 3.2

GREENHOUSE GAS EMISSION COMMITMENTS WITHIN THE KYOTO PROTOCOL



THE AVERAGE COMMITMENT FOR ALL ANNEX 1 COUNTRIES IS AN EMISSION REDUCTION OF 5.2 PERCENT BY 2008 TO 2012 BASED ON 1990 LEVELS. Source: Kay (1998:2)

3.4 The US and Australian Approaches

A detailed outline of greenhouse reducing approaches taken in other Annex B countries is beyond the scope of this thesis. It is useful however to note some similarities between the Australian and US approaches. The US has adopted a mix of policy initiatives and measures, as analysed by Bernow *et al* (1999a) and summarised in Table 3.3. The US approach comprises:

> *... a robust mix of complementary approaches, including incentives, market creation and transformation, regulatory modernisation, technical assistance, efficiency and performance standards, research and development, and tax reform* (Bernow *et al* 1999b:10).

TABLE 3.3

AMERICA'S GLOBAL WARMING SOLUTIONS

TRANSPORTATION	INDUSTRY
• A vehicle efficiency initiative, including: progressively stronger fuel economy standards for cars and utility vehicles; an efficiency and emissions based rebate system for vehicle purchases; R&D for improved design, materials and technologies; public sector market creation programs for cleaner and more efficient vehicles; and standards and incentives for freight trucks and other commercial modes. • Urban/regional transportation demand management and related incentives: pricing reforms, including congestion and emissions-based pricing; land-use and infrastructure planning for improved access to alternative and complementary travel modes, including transit, walking and biking; facilitation of high speed intercity rail development; pricing, planning and informational initiatives to promote intermodal freight movement.	• Tax incentives to stimulate greater levels of investment in new more efficient energy-using manufacturing equipment, and RD&D to bring down the costs and speed the availability of more efficient equipment; • Regulatory refinement and technical assistance to remove disincentives for industrial combined heat and power (CHP), whereby electricity is generated on-site, rather than imported from the grid, by using the same fuels that produce heat for manufacturing processes.

• A progressively stronger cap on the carbon intensity of motor fuels, reaching a 10 percent reduction by 2010; R&D for cellulosic ethanol, other renewable fuels and associated vehicle technologies; renewable fuels commercialisation programs in various market segments, including public sector procurement programs.	
ELECTRICITY GENERATION • A progressively increased renewable portfolio standard, that would require suppliers to collectively provide 10 percent of generation by 2010 with renewable resources, with a credit trade system to ensure that the national target is met with a regional distribution that results in lowest cost. • A tightening of the 1990 Clean Air Act Amendment sulphur dioxide cap, which now halves the sector's emissions from 1990 levels to 9 million tons by 2000, to reduce them further to about 3.5 million tons by 2010. Also, a cap and trade systems for nitrogen oxides and fine particulates to bring their levels down. These pollution restrictions would reduce coal use and, thereby, carbon emissions. • A requirement for co-firing of biomass in coal plants, with credit trading, which is progressively increased to 10 percent by 2010, providing near-term carbon reductions and stimulating development of that resource. • A cap and trade (or tax) for carbon emissions to reduce the carbon intensity of the sector between 1990 and 2010 by about 40 percent.	**COMMERCIAL and RESIDENTIAL BUILDINGS** • Appliance and building standards that would establish norms for equipment, design and performance which, through purchases and practices, would reduce energy used to provide services in homes and offices. • Market transformation incentives including technology demonstrations, manufacturer incentives, and consumer education to reduce barriers to energy savings and renewables. • Initiatives to expand the use of combined heat and power for district energy systems.

Source: Bernow *et al* (1999b:12-17)

Australia became a party to the UNFCCC in 1992. The Convention aims to stabilise emissions of greenhouse gases at a level that would prevent dangerous, human-induced interference with the climate system. It was further strengthened when the Kyoto Protocol, was accepted in principle (but not ratified) in December 1997.

The National Greenhouse Strategy (NGS) is the primary mechanism through which Australia's international commitments will be met:

> *It aims to limit Australia's net greenhouse gas emissions, whilst developing knowledge about greenhouse issues and laying the foundations for adaptation to climate change* (Department of Primary Industries, Water and Environment 1999:8).

The NGS is an extension of programs launched by all Australian Governments in 1992, the National Greenhouse Response Strategy. The NGS provides for monitoring of progress, especially in relation to the Kyoto emission target, and for ongoing review of monitoring regimes in light of changes in circumstances. The first review will be conducted during 2002, or earlier if necessitated by developments relating to the UNFCCC and the Kyoto Protocol. Implementation of the NGS involves major reductions in Australia's projected emissions growth, as consistent with meeting international commitments.

The Commonwealth, states and territories, in cooperation with local government and industry, worked collaboratively to develop the NGS, which was finally launched in 1998. It has three main fronts:

1. improving awareness and understanding of greenhouse issues;
2. limiting growth of greenhouse emissions and enhancing sink capacity; and
3. developing adaptation responses.

These core objectives and related industry development opportunities can be summarised by subject headings within five of the key NGS modules :

TABLE 3.4

KEY NGS MODULES

Module 1 PROFILING AUSTRALIA GREENHOUSE GAS EMISSIONS • Preparing and improving greenhouse inventories • Projecting future emissions	**Module 4** EFFICIENT AND SUSTAINABLE ENERGY USE AND SUPPLY • Harnessing renewable energy • Improving end-use energy efficiency
Module 5 EFFICIENT TRANSPORT AND SUSTAINABLE URBAN PLANNING • Integrating landuse and transport planning • Travel demand and traffic management • Encouraging greater use of public transport, walking and cycling • Improving vehicle efficiency and fuel technologies • Freight and logistics systems	**Module 6** GREENHOUSE SINKS AND SUSTAINABLE LAND MANAGEMENT • Enhancing greenhouse sinks • Enhancing sustainable forestry and vegetation management • Reducing greenhouse gas emissions from agricultural production
Module 7 GREENHOUSE BEST PRACTICE IN INDUSTRIAL PROCESSES AND WASTE MANAGEMENT • Reducing greenhouse gas emissions from industry • Reducing methane emissions from waste treatment disposal	Source: National Greenhouse Strategy (1998:3)

From this brief overview of elements of the US and Australian policy approaches to greenhouse, consistent themes can be seen to emerge. These themes also blend very well with the definitional trends described above for the greenhouse industry. For example:

Bases for Defining the Greenhouse Industry	**Greenhouse Policy Approaches**
- Engineering and technology approaches	- encouraging greenhouse best practice incentives to stimulate greater levels of investment in new more efficient energy-using manufacturing equipment, and RD&D
- Energy Conservation	- introduction of renewable energy percentiles for generators and retailers.
- Management Tools	- profiling and benchmarking emissions internationally and nationally and introducing environmental and market acceptable limits

These three examples clearly evidence the US and Australian governments' policy approaches which are becoming increasingly market oriented and consumer/developer sensitive, 'encouraging and stimulating' rather than being 'regulatory and enforcing'. This is reflected on a global level in the Kyoto Protocol, with its flexible mechanisms and opportunities for national approaches to implementation.

The Kyoto Protocol can be likened to *Our Common Future* and the corresponding national adoption strategies analysed by EM theorists and canvassed in Chapter 2. Earlier it was argued that evidence of weak EM includes tendencies for top-down policy generation, and the existence of a rhetorical environmental discourse at the expense of concrete environmental best practice and a genuine commitment to ecological outcomes. The brief outline offered in this chapter demonstrates greenhouse as a prominent element in international ecological modernisation. Global warming has become such a major issue that the majority of OECD countries now attempt to demonstrate their commitment and effort towards greenhouse abatement by way of national policies and statements of intention to reduce pollution levels. This process simultaneously allows a polity to develop a policy rhetoric and claim political credits from green credentials when the 'greenness' from many perspectives is extremely dubious (for example, by claiming that their nuclear power generation capacity is greenhouse friendly).

3.5 Prologue: Setting the Greenhouse Scene for Tasmania as an EM Case Study

Greenhouse development is the example *par excellence* of EM (and neo-liberalist policy approaches for environmentalism generally), and provides a framework for interrogating policy rhetoric and the institutional uptake of environmental values.

The remaining chapters combine this and the greenhouse definition to analyse Tasmanian policy trends and political events in forest and renewable energy management. Accessing and processing Tasmania's forest resources and the building of hydro-electricity schemes have been at the frontier of economic development in Tasmania. These resources have not been developed with an environmental consciousness, but within a mode of thinking dominated by development imperatives

based upon a strategy of resource extraction and energy expansion. It will be demonstrated that while these industries are presently being marketed as greenhouse friendly ('clean and green'), these values are superficial only and have not been instilled into the mainstream development ethic. The actual opportunity to market and develop the Tasmanian economy in terms of greenhouse credibility will be shown to be far more limited than this rhetoric suggests. It is constrained by environmental capability, historically accumulated policy debt, and an inability of governments and established institutions to embrace a reflexive approach to EM (largely due to historical constraints).

Tasmania acts as an overall greenhouse sink. In a greenhouse conscious global economy, this should provide a potential economic advantage to the state. The thesis of this study is that the Tasmanian government will not be able to take advantage of this position though it suggests that it can.

Economic processes in the global economy give rise to competitive pressures for traditional commodity-based industries and regional and resource dependent economies to 'manufacture' expressions of competitiveness in order to attract global investment in forms that differentiate them from their competitors. Traditionally, exploitable characteristics have included labour costs, proximity to markets and concessions or incentives provided by governments (such as the provision of cheap electricity). More recently, environmental credentials and a marketable 'green' image have been added to this box of tools. These are partly the result of the globalisation of the economy, and partly the result of a growing international environmental consciousness.

Tasmania is one such small, remote, resource-based economy. Intensive competition for international capital has forced continual repackaging of its economy and its resource profile to fit global markets. Historically, this has resulted in a constant accumulation of 'policy debt' - political institutions that operate constantly in a reactive top-down mode as opposed to being proactive and 'reflexive'. Opposition to this trend is most evidenced by the emergence of green politics, which matured from a conservation movement more commonly associated with the 'alternative' social fringe

of the 1960s, into an organised political movement participating successfully in the formal electoral system. Hay notes, in opposition to the political stability that characterised the decades prior to the 1970s:

> *With the mobilisation of vigorous opposition to hydro-industrial hegemony in the form of the abortive campaign to save from hydro-inundation the 'jewel in the wilderness crown', Lake Pedder, Tasmanians were suddenly faced with disputations about first principle and alternative visions* (1991: 63).

The flooding of Lake Pedder in the early 1970s to produce cheap electricity for industrial development marked the first major event in Australian conservation politics:

> *In Tasmania, the dominant values find expression in a deep-rooted ideology of hydro-industrialisation... the supply of cheap hydro-electric power became an article of faith for several generations – the central unquestionable plank in what passed in Tasmania for political thought* (Hay 1987:4).

In the decades following, further development of hydro-electric schemes provided a point of coalescence for groups and individuals of the green persuasion. Tasmania's Hydro-Electric Corporation strongly influenced the management of the economy and politics, but so strong was the unity among conservationists and so potent their political response that the traditional two party system could no longer command the allegiance of almost all Tasmanian voters. From its fledgling days as the United Tasmania Group, the movement evolved into the Tasmanian Greens, and at their peak (in the 'Labor/Green Accord' from 1989 to 1991 [Hay 1998:103]) they held the balance of power in government.

> *Beginning in the early 1970s with the Lake Pedder Action Group and the world's first 'greens' party, the United Tasmania Group, adherents of ecological values have long been effectively organised in Tasmania. With land-use issues almost continuously 'on the boil' since 1970 the environment movement has become increasingly strong and skilled, and the resultant clash between the fundamentally opposed values of ecology and what Morrison termed 'growthism' has thrown these irreconcilable differences into sharp relief* (Hay 1987:4).

Pinnacle events in the history of the Tasmanian green movement are characterised by the development of hydro schemes and forest clear-felling for the woodchip industry, core historical activities traditionally managed and promoted by government.

It can be argued that Tasmania's geography and environmental assets combine to make it a world class environmental icon. In recent years this has been marketed by almost every tradable entity in the state's economy (through environmental labelling and a 'clean green image') – a far cry from the dispute over the flooding of Lake Pedder, a hydro-electricity scheme that is now claimed as clean, green renewable power. This image, and the consequent dependence on it by some industry sectors, is a direct reflection of economic drivers, market demands and consumer preference in the global economy.

Specifically, the threat of climate change has spurred the international community to implement agreements, protocols and commitments to reducing those elements that contribute to the warming of the Earth's surface - the greenhouse effect. In Tasmania, in a normal year, of all the electricity generated (including self-generators at Australian Paper and waste flue gas generation at TEMCO) approximately 98 percent is generated from renewable hydro-power. According to the Tasmanian Greenhouse Statement (TGS), nearly half the island is covered by carbon trapped or carbon reducing forest (3.3 million ha), helping make the state an overall net carbon sink (Department of Primary Industries, Water and Environment 1999). By contrast, all other Australian states and territories are net greenhouse contributors. Tasmania,

therefore, has a number of natural and historical advantages, which suggests, on the surface, that it should be well placed to capitalise on these global market trends in a greenhouse reducing context.

The remainder of this paper will therefore explore the characteristics that comprise elements of a 'greenhouse industry' in Tasmania. The framework detailed in Chapters 1 and 2 will be presented as a basis for observing development opportunities in two Tasmanian government-owned and managed business sectors (forestry and renewable energy) that have a significant greenhouse role in the Tasmanian economy, applying EM and greenhouse industry definitions to examine clean and green greenhouse credentials. The use of EM will provide the opportunity to critically assess the real extent of the state's ecological reform, or the extent to which greenhouse provides a basis for official recourse to an empty clean and green rhetoric.

4. Carbon Sequestration and Forestry

This chapter uses forest policy, to assess the way contemporary policy in Tasmania has been adapted in light of greenhouse issues, to assess the degree to which EM has occurred in the Tasmanian context, as well as how 'real' this EM is, and to assess the degree to which perceived greenhouse opportunities are real. In order to do so, it is useful to provide a historical context to forest management in Tasmania. This is necessary in order to demonstrate the way in which environmental issues in general have been dealt with, evidencing the evolution of a forest management policy culture in the state. A historical context will also help to assess the persistence of a particular policy culture regarding the relationship of forest policy management to environmental issues. The policy emphasis on greenhouse sinks and the discourse provided for community consumption can then be compared with the actual opportunities for greenhouse sink development. This will provide evidence of the extent to which, EM, if it is occurring at all, is weak or strong.

The incorporation of concepts such as ecological sustainability into forest management principles is now commonplace, evidence that EM is in fact occurring in the area of forest management policy. The case study outlined in this chapter includes a summary of the emergence of a sustainable ethic within Tasmanian government forest policy. To trace the way in which the concept of sustainable development has been adopted, evidence such as the establishment of conservation reserves, key policy agreements and aspects of the economics of forestry and cycles of capital particular to forestry production will be identified. This will background our assessment of the degree to which EM is occurring, and how greenhouse opportunities may or may not be contributing to this. The framework developed in Chapter 3 will then provide a means of assessing green credentials and opportunities in terms of greenhouse related forest policy.

Thus the chapter will reflect this approach by considering:

- the historical background to the policy management of public forests in Tasmania;

- sink development/flexible mechanisms under the Kyoto Protocol and development opportunities; and
- ownership of carbon credits in partially public owned business deals and the potential greenhouse benefit and real investment opportunities in Tasmania.

4.1 Historical background to the policy management of public forests in Tasmania

Forestry operations can be strategically organised in order to maximise profitable production as well as maintaining ecological and cultural values. Some outputs are constrained, however, by the requirements for long rotations (up to 80 years in the case of sawlogs) and the inability to realise quick capital returns. Historically, the pursuit of economic outputs has therefore required intervention on the part of the state. Such intervention has traditionally been justified by the need to invest for future generations and to ensure industry longevity. It was on these grounds that the Tasmanian Forestry Department emerged in 1921 with a forest policy context drawing upon German scientific influences and principally aimed at production for 'sustainable yield':

> *In Germany during the early and middle 19th century when the concept of sustainable yield was being formalised and incorporated into forestry textbooks, the forests had long been managed purposefully. When stands of trees had reached a desired degree of maturity ... were 'ripe'... there were cut; the land was restored to forest; the trees grew for a new cycle, leading to another forest ready for harvest at some future date...* (Clawson and Sedjo 1983:3).

Faced with a risk of further depletion of timber resources, the government was driven to protect forests from uncontrolled clearing for agriculture and decreasing access to timber resources combined with wasteful logging practices. The 'clearing' mode of thinking was reflected in late nineteenth century parliamentary Acts that relegated large tracts of unallocated resource the status of wastelands (Hall 1992). The Forestry

Act 1920 (and subsequent establishment of the Forestry Department 1921 that, through later amendment of the Act, became the Forestry Commission in 1947) created the basis upon which rights of access could be determined and managed. The development of these access regimes over time and the core government organising strategies deployed by the state have been summarised by Dargavel (1991:134). Table 4.5 below combines Dargavel's categories with more recent changes to Tasmanian forestry organisational strategies and demonstrates the transition and emphasis of forest policy from sawmilling to woodchipping as primary strategy, the shift from state to non-state management responsibility, and the shift from long term lease to short term contracts for timber products:

TABLE 4.5
POLICY DRIVERS AND ACCESS REGIMES 1895 TO PRESENT

Period	Dominant Policy Driver	Resource Regime	Access Rights	Locus of Responsibility for the Forests
1895-1920	Small sawmills	**Exclusive Patch**	Sawlog: lease for up to 21 years	Nil
1920-1980	Small sawmills	**Exclusive Patch**	Sawlog: permit for up to 15 years	Nil
1901-1943	Large sawmills	**Exclusive Patch**	Sawlog: special Act for 21+ years	State
1930s	Pulp and paper	**Exclusive Concession**	Pulpwood special Act for 80+ years	Company
1959, 1961	Pulp and paper (integrated multi-product)	**Integrated Concession**	Pulpwood special Act for 80+ years	State
1968	Pulp and paper, Woodchip	**Integrated Concession**	Pulpwood and Woodchip special Act for 15 years	State
1980	Pulp and paper, Woodchip	**Integrated Concession**	Sawlog: quota allocation for 2 years	State
1995	Pulp and paper, woodchip	**Wood Supply agreement**	Woodchips: negotiated contract of sale for 100,000^{+} tonnes of wood for 10 years (some companies residual concession)	Forestry Tasmania Corporation and some Company
1995	Woodchip	**Gazetted Rights**	Sawlogs: 10 year negotiated contracts (guaranteed quantity for 5 years)	Forestry Tasmania Corporation
1995	Sawmills	**Competitive Bidding**	Sawlogs: tendered in parcels for up to 5 years	Forestry Tasmania Corporation

Source: Beckitt (1995:9) based on Dargavel (1991:134)

These historical access regimes were determined by balancing the need to attract investment capital and to maximize the value of production. Based on Le Heron's (1990) terminology, forest policy in Tasmania up to the introduction of competitive bidding sawmill supply can be described in terms of varying degrees of welfare capitalism, which has persisted throughout the various phases described in Table 4.5. In fact, current policy retains quite a deal of this characteristic:

> *Wood-wise, waste-wise... the value-adding wood centre planned to process wood from the Southern forests. Today, the forest is harvested for sawlogs, veneer logs, woodchips and firewood. All the short and smaller pieces of logs and residue are burnt in the forest. In this new project, the harvested logs will be carted on forestry roads to the one central site in State forest. Every piece of wood will be productively used, even the ash and the mud. The plan is to make the project site investment-ready...* [which means]... *that the site will be prepared with all planning and zoning approvals finalised with the local council, including planning for roads, site power and waste management, so that the site will be ready for businesses to invest in the new value-adding processes* (Forestry Tasmania 2001:1)

Governments normally respond to the potential shortfall of timber supply by investing in long rotation crops not usually attractive to private investment. In fact Tasmania responded by providing third world style concessions to attract large companies and foreign capital. After concessions had been granted to sawmilling companies and these subsequently collapsed, the government turned to the pulp industry. It traded industry security for value adding by providing monopoly access to what could have been valuable sawn timber. In the early 1970s the benefits afforded to pulp companies were extended to woodchipping businesses through further concessions. While it was couched in terms of these concessions being granted for access to the residue created from sawlog harvesting, this has been widely contested and seen as a further reduction in value adding (Harries 1985).

It became clear in the 1990s that the Forestry Commission was playing the role of both regulator and developer. This was to be overcome through the corporatisation of the Commission to create the current Forestry Tasmania Corporation. The objectives of the Forestry Tasmania Corporation (Government Business Enterprise) are listed in schedule 1 of the Government Business Enterprise Act 1995:

Objectives of corporation
7. As a manager of forest land with a commitment to multiple use, the objectives of the corporation are to optimise -
(a) the economic returns from its wood production activities; and
(b) the benefits to the public and the state of the non-wood values of forests.

The second, and perhaps secondary objective, 7(b), is of particular relevance to a discussion on greenhouse sink development opportunities and other contemporary policy initiatives that reflect characteristics of EM.

Elements of welfare capitalism have not been, and cannot be, fully erased from public or semi-privatised forest management. This is because quality sawlog and veneer rotations require up to 100 years (3 generations) of capital immobility in eucalypt species, and, up to 600 years in the case of some special species. Attempting to attract private capital to back this sort of investment is very difficult due to the uncertainties associated with realising adequate return. The state therefore continues the welfare capitalist mode of management in which it attempts to develop elaborate mechanisms for attracting capital through a range of instruments, including guaranteed supply agreements, renewal of rights, supply of low-cost energy, provision of transport infrastructure and alternative mechanisms for transfer of profit (such as share or joint venturing). In order to achieve this there needs to be in-built flexibility; yield and product mix need to be sufficiently varied to keep pace with market demands. Both the state and federal Governments have developed policies to attract investment and make forestry a more 'standard' industry to invest in by way of taxation schemes and various other market tools.

4.2 Contemporary Forest Policy

Currently, both state and federal Governments are pushing the growth of plantation/regrowth forests to reduce national dependence on timber imports and to make up the shortfall in resource supply created by increased efforts to conserve areas of remaining native forests. Greenhouse has added a second justification for this plantation strategy because it theoretically provides sink enhancement opportunities. In this way, carbon sink development has provided an opportunity to ecologically modernise production forestry as a legitimate environmental activity. It has done so in two ways. First, plantations result in a reduced concentration of harvesting effort in native forests, second they can assist in ameliorating the effects of dry-land salinity, and third, they can assist in the control of climate change. The Tasmanian Government's current Forestry Growth Plan (FGP) illustrates the emphasis on plantation development. Outlined below, the FGP illustrates contemporary management thinking on how this can be achieved in the immediate future in the context of Commonwealth and state initiatives:

Forestry Growth Plan

Released in November, 1998, the Program is a blue-print for investment and development for 10 years and beyond. If a post-RFA expansion policy is followed, an intensification total of 100,000 ha over 10 years would be targeted. This would include:

- *40,000 ha eucalypt plantation conversion;*
- *16,000 ha eucalypt plantation purchase/lease;*
- *20,000 ha softwood plantation conversion;*
- *8,000 ha softwood plantation purchase/lease;*
- *10,000 ha early age spacing;*
- *6,000 ha commercial thinning; and*
- *Plantation expansion would slow in the period 11-20 years, thereafter based on replanting following harvest.*

The vision of State Forests in 10 years time is of 7.8 percent new and existing plantations (120,000 ha), and 43.4 percent native forestry (660,000 ha).

Targets for plantation establishment outside of State Forest are likely to be severely affected by the ability to access land.

(Source: Forestry Tasmania, 2000)

In order to achieve this ambitious goal, the Tasmanian government has seized all strategies available to it, including the potential to attract investment in plantations by offering rights to carbon credits from those trees. A later section of this thesis will argue that this strategy is high risk, because of uncertainty surrounding the rules and definitions associated with an international emissions trading system.

4.2.1 Privatisation in Government Forestry production

Superimposed on this, contemporary micro-economic reform of various aspects of government has brought about the corporatisation of the management structure of Tasmania's public forests. The corporatisation of Forestry Tasmania marked the start of what was intended to be a move from an '...era of state-managed welfare capitalism ... to a more open and less interventionist economy' (Le Heron 1990:195) in Tasmania. This has seriously limited for the capacity of government to build environmental considerations into contemporary forestry management regimes. Greenhouse is one such consideration. Le Heron has comprehensively described the New Zealand experience of the 1980s-1990s, and his critique applies equally well to Tasmania.

While changes have been made to the legislative environment in which FT operates, a number of structural impediments remain intact as non-variable attributes of forestry development. According to Le Heron, industrial forestry involves the circulation of capital through the stages of tree planting, processing and reafforestation (to preserve utilisation investments), and is dependent on science and technology to decrease the turnover time of capital and reduce biophysical risks (1990:196). This evidences some of the non-changeable aspects of industrial forestry with which any form of management structure has to contend:

> *The focus to date has been on native forest management. Nevertheless, initiatives such as the Wood and Paper Industry Strategy (WAPIS), the Farm Forestry Program (FFP) and Plantations for Australia: the 2020 Vision (Vision 2020) have been directed to addressing at least some of the*

issues arising along the whole of chain production (ie. from growing to processing (ForWood Australia 2000:2).

The most recent state-based initiative addressing sustainable forestry growth and future prospects for Tasmania has been the Forestry, Timber and Paper Audit, which reflects transitional trends, commodity vulnerability and the import/export timber products deficit in Australia. Both *ForWood Australia* and the industry audit echo the New Zealand experience of mass afforestation and industrial initiative by both private and public sectors in the 1960s. New Zealand forest development policy during this period, according to Le Heron (1988), was aimed at encouraging expansion of forest product exports. To achieve desired export levels by the 1980s this policy needed to consider land resource limitations, product diversification, and value adding to processed forest products (in comparison with agricultural products). FT's current attempts to embark on a new direction emphasising intensive forest management and expanded plantation development mirror these elements of New Zealand forest strategy.

From a government perspective forestry management needs to be multifaceted, concerning itself with industry development, social welfare and environmental responsibility. This requires, however, the less-than-compatible roles of mediator and investor, and in order to maintain profitability the state is often involved in sharing the cost of production in an environment where risks are often socialised while profits are not. Such observations square with Le Heron's view that ' *...every phase of industrial forestry is amenable to degrees of co-ordination by the state or private sector with varying degrees of success'* (1988:4).

New Zealand created a commercial forestry corporation in 1986, almost 10 years prior to Tasmania. In designing this change it was originally intended that the corporation would comprise separate processing and wood resource companies. Industry, however, protested such differentiation, arguing that the corporation should be concerned only with growing trees and selling logs. Industry argued further that full or partial privatisation would benefit the nation as it would create threats of possible takeover that would force efficiency. Commercialisation, however, requires that the

company or corporation at least breaks even; that is, the value of output must at least equal the value of resources used. The need for realistic pricing is therefore axiomatic. The question that this raises, however, is how then do concessionary timber prices, particularly for the sawn timber markets, be maintained in such an environment? Can it be guaranteed that realistic log prices mean that processors with the best technology and value added products are the only ones who stay in business?

Synthesising the conflicting philosophies of welfare capitalism and privatisation/corporatisation creates problems and challenges for the state, particularly when combined with the simultaneous need to assimilate ecological management objectives. Changing societal and government perceptions and preferences for certain economic futures has significant implications both for subsidising particular categories of investment (and maintaining established production processes) and for defending a fully commercial state forest enterprise, particularly, in an environment with a changing resource base. Strategic restructuring can in itself bring on particular outcomes (for example, by choosing to emphasise either socio-economic or ecological values). In the forest industry sector full privatisation can dictate a radical shift in forest management regimes together with major ramifications for the management of ecological values. For example, past monopoly regimes have been required to reduce risk by ensuring resource security and by differentiated forest rotations that establish cyclical (as opposed to boom–bust) capital returns. These pressures are reflected in New Zealand's long term plantation strategy which:

> *From the outset, distinctive state-economy relations made possible the planting of exotic forests that 30 years later gave modest increments to sawmills and rapid growth of a pulp and paper industry, to the full extent of the exotic forest resource. The links between afforestation and utilisation have never been automatic despite attempts ... to treat forestry and processing, conceptually and in practice as a single production line (1998:27-260).*

These changes in forestry management need to be considered in light of changing societal perceptions and growth in environmental due diligence. More so than private

enterprise, government business enterprises are constrained by the complexity of competitive markets and community service obligations that include conservation. Tasmania has experienced a series of production forestry v conservation conflicts, over a long period. Notwithstanding a change in the language used and altered production regimes, conflict has not declined. Conservation v resource security tension has created a dilemma for governments throughout Australia. The Commonwealth government's response was the Regional Forest Agreement (RFAs) initiative – which now forms the foundation of contemporary forest policy in Tasmania.

4.2.2 The Contemporary Policy Environment: EM and The RFA

The RFA process was an attempt to establish, on the basis of scientific rigour, the details of forest communities, forest production and all relevant socio-economic values. This, it was hoped, would provide a basis, acknowledged as legitimate by all parties, for compromise between production forestry and conservation, and thereby deliver security of access to forest resources while conserving representative biological communities. If a compromise was to be ultimately resolved through this process it had to be able to deliver a vision of the future for government and specifically for the policy role of government as a production forester. To some extent the RFA satisfied those taking a middle ground, which is to say those reflecting the characteristics of an 'ecologically modern' position. Under the RFA, forested land was assigned either a production or non-production status. The future potential for expansion or maintenance of specific levels of industrial forestry was in this way prescribed. The RFA enabled future forestry development in those areas assigned production forest status by providing resource security, while constraining future development by demarking where forestry could and could not occur.

The precise nature and biogeographic distribution of forestry operations was to be determined in this context and have the support of policy documentation, embodying a commitment to an ecologically modernised sustainable future. However, this process was, according to conservationists, seriously flawed:

> *... the RFA and TASVEG 2000 mapping are inconsistent. It is therefore not possible to use these data sets to verify claims with any degree of certainty once the land has been planted... once an area is cleared of native forest, and the data sets show conflicting vegetation types, how can it be proved what forest was originally there* (Cadman 2000:8)?

Aspects of Tasmania's RFA are still being developed and it has been within this context that the opportunity has emerged for potential carbon trading and investment attraction through sink development. The RFA has meant that the corporatised Forestry Tasmania now operates with a 'restricted' but defined resource. With decreasing supplies of old-growth timbers there is a corresponding development of plantation and regrowth strategies as outlined in the Forestry Growth Plan. These changes became necessary to ensure sustained production and economic growth in the forestry sector. Furthermore, to achieve appropriate economies of scale for new business opportunities and to maintain existing market access (including existing supply agreements) partnership with private enterprise has increased, as well as the purchase of private land for further plantation establishment. Greenhouse is one of many components of managing these processes. Companies likely to incur greenhouse penalties under a carbon credit trading mechanism have moved quickly to take advantage of any potential opportunities and have approached the Tasmanian government with expressions of interest in plantation development, carbon rights being an important component of the proposals (as in the case, for example, of the Tokyo Electric Power Company/Mitsubishi plantation project).

The sudden growth in plantation forestry is thus in part being made possible by global greenhouse policy. But a dilemma exists which EM can help to explain. It has been estimated that seventy percent of Forestry Tasmania's plantation timber will come from native forest conversion and that, because only eighty percent of Tasmania's native forest estate has to be maintained under current conservation measures, the remaining twenty percent, which includes areas of high conservation value is under threat (Cadman 2000:4). Surely if eighty percent of Tasmania's native forest estate is to be maintained and only twenty percent available for production, the policy

environment has permitted quite a deal of compromise. In Dryzek's words, the RFA has been developed through a partnership in which the government, businesses, moderate environmentalists, and scientists cooperated to restructure the Tasmanian forest economy along more environmentally defensible lines, a classic case, in other words, of EM (1997:144).

Because a number of concerns remain, however, and because (at least according to Cadman) the ground facts are unclear, the 'sustainability' of the current policy can be called into question. Firstly, twenty percent can be converted to plantations, and secondly this twenty percent may include areas of high conservation value. Thirdly, the scientific basis for defining land tenure can be questioned, and finally, carbon rights and associated greenhouse policies are unclear and at best tenuous business imperatives.

Thus the ground between a sustainability rhetoric and a sustainable clean and green reality can be challenged. While it can be observed that EM is occurring by recourse to the contemporary environment discourse characterising forestry management, its extent can still be questioned. In reference to the RFA, for example, many of the scientific measures used for mapping and identifying communities, rare and threatened species have not been fully resourced, verified or in some cases even finalised. This ambiguity is reflected in carbon sink science and economics. Any investment in carbon based sinks pre-empts the development of rules of trade and raises questions about verification and the presence of expertise (one element of the greenhouse industry defined in Chapter 2). This will become more evident in section 4.3.1.

While Government forestry management has learned the language of sustainable development, traditional sawlog resources have steadily declined, while wood residues for pulp and fibre markets have increased and become increasingly competitive on a global scale. The societal concern for deforestation has not diminished alongside these changes. This has been evidenced under a recent Tasmanian government consultation strategy, *Tasmania Together,* which purports to examine future options for economy and society. One of the core findings of this

project is that there is an overwhelming belief in the state's clean green image, as well as a desire to discontinue native forest logging and woodchip exports. EM theorists, such as Hajer, acknowledge that such discrepancy between popular opinion and rational policy is likely to be commonplace. The implications of this discrepancy relate to the problem of legitimising policy in the face of a lack of popular support:

> *There are at least two features of environmental politics that could indeed be causes of concern – first the changing basis for legitimate decision making, and second, the hidden link between science and politics* (Hajer 1995:10).

The RFA and post-RFA policies are scientifically authoritative bases for legitimising forestry and other industry activities on forest lands as an aid to political decision making, thus evidencing Hajer's observations. The RFA 'sustainability' compromise, is itself evidence of EM occurring, is also intended to alter the politics of forest debate, and not necessarily for ecologically holistic reasons. Highlighting this tension and identifying the dangers of removing qualitative aspects of politics demonstrates the strategic utility of EM theory. Sustainability policies can indeed undermine progress towards more environmentally benign futures.

In order to achieve post-RFA expansion, the circulation of capital through planting, processing and reafforestation needs significant re-strategising, especially because of the declining availability of larger diameter logs. Greenhouse as a legitimate environmental concern recognises that trees store carbon and that younger, faster growing plants sequester carbon more rapidly. Chip and pulp rotations are suitably matched with this naturally occurring characteristic because they are relatively short, removing trees at an age when optimum growth rates have been reached. Recognition of the need to reduce turnover time in the forest harvest and post harvest production capability cycles alongside the added bonus of carbon sequestering potential, provides some incentive to induce the transition from older to younger aged production. Further, fibre markets are globally orienting preference to younger monoculture clearwood over traditional mixed species 'inconsistent' old growth ('residue') fibres. Arguably there is an impetus to sell off older fibres while markets remain, in

preparation for competitive positioning. This assumes in the first instance that the same markets and the same products should be pursued.

4.3 Sink development flexible mechanisms under the Kyoto Protocol and development opportunities

4.3.1 Definition of Carbon Sinks

Chapter 3 provided a definition of the greenhouse industry. In developing this definition the significance of the Kyoto Protocol and the targets set for individual countries were described. Flexible mechanisms under the Protocol have been designed to maximise the opportunities for individual countries to reduce global warming impacts cost effectively and measurably. Carbon sinks are one such mechanism defined under Articles 3.3, 3.4 and 3.7 of the Protocol.

Braswell *et al.* describe global carbon cycles in terms of a natural 'conundrum'. Increased global temperature can both increase and decrease atmospheric carbon dioxide (the key greenhouse gas) at the same time:

> *...increased temperatures facilitate the release of carbon from soil; carbon released from organic matter such as soil is oxidized to carbon dioxide. However, increased temperature also leads to increased growth in plants, which absorb carbon dioxide. Thus, ecosystem processes moderate between global warming and plant growth* (1987:870).

The carbon sink mechanism is intended to provide cost-effective opportunities to reduce overall greenhouse emissions by afforestation and reforestation to increase carbon absorbing plant matter. It was envisaged that it would encourage the reforestation of previously cleared lands – this being generally 'environmentally desirable'. Because of the above ecosystem balance or 'conundrum' highlighted by Braswell *et al*, rules applying to sink development under the Kyoto Protocol have yet to be fully defined. The aim of the sixth Conference of the Parties (CoP 6) in November 2000 was to reach agreement on the nature of these rules – indeed, it was

to reach decisions on whether sinks as a flexible mechanism are appropriate. The ensuing debate suggests that on an international scale a resolution is unlikely:

> *US turns down meeting on climate change...The 6th Conference of Parties (COP 6) to the UNFCCC ended in failure largely because of European Union countries and a U.S. led group of nations' inability to agree on critical issues... In particular, the question of whether forest sinks should be allowed to generate emission reduction credits under the clean development mechanism remains a major hurdle. The idea of planting forests to sequester carbon dioxide (CO2) was one of the more controversial proposals designed to help countries meet greenhouse gas emissions targets...Greenpeace International accused the U.S. and the Umbrella Group of confirming its judgement on COP 6, which was that it 'would be remembered as the moment when governments abandoned the promise of global co-operation to protect planet earth'* (ENS 21 Dec 2000).

The development of rules under which growth of vegetation constitutes an internationally credible carbon sink that can contribute to legally binding greenhouse gas (GhG) emission targets under the Protocol is critical. Broadly speaking, the Kyoto Protocol definition of a carbon sink is a planted forest established after 1 January 1990 on land that was previously cleared, such as agricultural pasture. By measuring the sequestered carbon in such sinks, credits can be awarded, and these can then be traded-in to counter for emissions or on-sold to other net emitters. A simplistic and relatively inexpensive approach to abatement was intended.

Specifically, the Kyoto Protocol provides for the inclusion of sinks through Articles 3.3, 3.4 and 3.7. The Australian Greenhouse Office, in a discussion paper produced in early 2000, notes:

- *under Article 3.3, currently allowable sink activities are confined to afforestation, reforestation and deforestation since 1990;*

- *Article 3.4 sets up a process for negotiating additional sinks activities that developed country Parties may apply in the first commitment period and must apply in the second and subsequent commitment periods; and*

- *Article 3.7 allows Australia to include emissions from land clearing in 1990 in the baseline for the calculation of its assigned amount. Key issues in the Kyoto Protocol's treatment of sinks must be resolved through international negotiations.*

At this point in time a number of definitions exist. Definitions and operational and measurement issues that await decisions from further Conference Of the Parties (COPs) are:

- *precise definitions of afforestation, deforestation and reforestation;*
- *the meaning of a forest;*
- *how and which additional sinks activities in the agricultural soils and land-use change and forestry categories are to be included under Article 3.4;*
- *the meaning of 'human-induced'; and*
- *how changes in carbon stock and greenhouse gas emissions and sequestration as a result of Articles 3.3 and 3.4 activities are to be measured* (AGO 2000:2).

4.3.2 Development Opportunities and Economic Return

The development opportunity and economic benefit to be gained from sink enhancement emerge from reducing a country's overall emission profile and therefore avoiding punitive measures from the international community, or by providing a surplus (ie. more carbon sequestered than overall emissions) which can be sold. With respect to the latter, it is up for debate as to ownership of credits given to 'sinks' developed, and whether it is in the interests of individual countries to maintain the credits for national benefit, or provide rights to private individuals for trade and benefit.

The Kyoto Protocol thus set in place a system for emissions trading, but did not entirely define the rules. Sink development is, in any case, generally regarded as having a relatively small potential to contribute towards global emissions reductions (for example Barbour 1999). Importantly, Article 3.4 of the Protocol refers to 'Additional Sink Activities' as distinct from existing sink capacity pre-1990. In principle this is intended to preserve existing sink capacities and to avoid the Protocol being used as a perverse incentive to clear existing sinks and replace them with Kyoto accredited sinks. There is much contention around what 'previously cleared' should mean and, consequently, what sink activities should or should not be accredited, as the physical land capacity for sink establishment is limited globally by both the availability of space, and the economic costs of establishment. Furthermore, even where sink establishment is possible, the outcomes in terms of the amount of carbon sequestered may be lower than anticipated:

> *... the average biomass of a plantation is considerably lower than the maximum attainable biomass, due to the harvesting process... the average exists at approximately half of the maximum tree biomass... of the whole tree, only the main stem or trunk is removed for industry. The remaining plant material decays rapidly and the carbon returns to the atmosphere* (Barbour 1999:3).

Finally, the potential to offset emissions by sequestering carbon in forests is limited under the Kyoto process. The accrual of credits is achieved by establishing commitment periods in the future, within which an individual country (and consequently individual business) has its emissions measured at the beginning and end, to account for greenhouse contributions and reduction requirements. The first commitment period under the Protocol is 2008 to 2012 and the only credits which can be sold in order to meet Kyoto targets are those sequestered during the commitment period. Carbon sequestered after 1990 but before 2008 will not be a saleable asset to achieve Kyoto targets. This is a critical factor when considering development opportunities and needs to be considered when analysing the tone of government and business oratory on greenhouse sink opportunities.

In order to clarify sink business opportunities there are in principle three core possibilities: to lease or sell space to a sink developer; to establish a vegetative capacity on land previously cleared with the intent to gain multiple economic benefits (such as timber production); and to establish vegetative capacity in terms of environmental plantings unlikely to be harvested or cleared. Each of these opportunities will be considered with respect to FT's responsibilities for the management and operation of government owned production forests, against an historical background of industry support and welfare capitalism.

The related issues that are not clear or resolved include:

- ownership of carbon rights (public goods held by the state or semi-private goods held by a GBE);
- what the actual opportunities are (post 1990 afforestation and reforestation on previously cleared land, and the availability of this);
- Tasmania's potential carbon rights competitive advantage (to boost FT revenue by selling available or potential credits to international businesses polluting elsewhere; to attract further plantation development; or for the state to pass on the credits available to it to existing manufacturers who need to reduce their emissions profile or potentially decommission plant, or for the state to provide the credits available to it to attract new industry much in the same manner as providing cheap electricity); or
- what possible mix of these might be put in place.

4.4 The Question of Ownership of Carbon Credits: The Potential Benefit and Real Investment Opportunities

FT manages a significant proportion of Tasmania's forest reserves, production forests and post-1990 (Kyoto) regimes. Eligible credits can potentially be sold and enhance FT's business position. Because the operating imperatives laid out under the Forestry Act specify a commercial focus for FT and require it to provide financial returns to the

state, FT's business activities do not necessarily contribute to a strategic re-positioning of the economy, and hence to the state's long term vision.

Until international definitions of 'Kyoto Forests' and 'Kyoto Lands' are clarified, a number of significant dilemmas will remain. For example, lands which have previously been used as managed forests or native forests cleared for the sake of sink development will not be eligible. Debate on eligibility is intended to rest on rehabilitation principles so that reafforestation of previously forested areas such as farmlands are eligible. Eligibility is critical for determining potential credits and therefore investment and ownership of carbon rights.

How questions of definition, ownership and access are resolved will determine the parameters of investment opportunity. However, the fundamental aim of the Kyoto Protocol is to reduce greenhouse emissions through a number of methodologies by creating liabilities on greenhouse intensive countries, which, in turn, seek to restructure their national emitters through regulation. In most cases, translation of Kyoto measures into national policies constitutes in effect, a carbon tax. Carbon credits and emissions trading are in essence mechanisms which make use of capital markets and competition in order to reward good corporate citizenship and penalise those behaving poorly – a tax which appears not to be a tax. Tasmania is potentially in a position to take advantage of those likely to be penalised, because it can offer them sink capacity and ownership of carbon credits. However, Tasmania also has its own share of industries that are likely to face significant liabilities.

Carbon Markets 'Worth Billions'

Australian Investors are set to capitalise on a $5 billion domestic market in carbon credits following this fortnight's announcement the Sydney Futures Exchange (SFE) will unveil the world's first trading market in the field by the middle of next year.... By establishing an exchange-traded market for carbon credits before the Kyoto Protocol comes into force, SFE can provide organisations with an early opportunity to lock in a financial position and secure a competitive advantage... (Australian Financial Review 1999)

The Tasmanian Government has been keen to seize the opportunity to sell carbon rights despite uncertainties surrounding ownership, or, it would appear, without considering the maximum potential benefit from any carbon credits available to it. On a 1999 overseas trade mission Premier Jim Bacon promoted Tasmania as an appropriate destination for investing in sink development and carbon credits. It has been apparent, however, that a strategy of selling carbon credits ahead of certainty over ownership or knowledge of how many credits will be available is risky.

Companies will invest only where there is clear and contracted benefit from emission reduction activity. Plantations can be established on lands previously not economically viable and 'environmental' planting can be undertaken where previously there has been practically no economic incentive to do so. Potentially opportunities for Tasmania exist to attract general business development because of the greenhouse advantages and/or carbon offsets that could be offered. The social and economic benefits however, need to exceed that of merely increased plant biomass. For example, if sinks are to be planted and the government is to retain carbon rights, the government could determine that a certain level of infrastructure would be built and a certain level of employment guaranteed and then pass the emission benefit to the investing business. Without exploring these considerations Tasmania may be underselling a capacity and a resource without maximising opportunities for growth.

4.5 Assessing the Sink Opportunity

The ability of FT to develop carbon sinks is severely constrained by the limited availability of cleared land. Of Tasmania's landmass (6,833,100ha), approximately one quarter is dedicated to agriculture (1,708,200ha) (State of the Environment Report 1996 and Department of State Development 2000). To date, plantations (177,258ha) occupy only 2.6 percent and this figure includes plantations on State Forest land. Added to this, although the hardwood plantation estate has been substantially expanded in recent times, and is thus difficult to authoritatively quantify, the National Plantation Inventory (2000) puts the hardwood plantation estate at 101,844 hectares, of which 82 percent (83,500ha) is privately owned.

FT's opportunites to acquire credits are therefore severely limited. Barbour notes that:

> *Beadle (1989) estimates that in Tasmania alone, 888 km^2 of forest would have to be planted to cope with its transport emissions over the next 100 years. This estimation is based on the use of prime agricultural land, which is not available to such an extent. Therefore less productive regions would have to be used, which in turn would result in a greater area of land being required to compensate for the lower site quality... Consequently the value of plantation forestry as a net carbon sink is limited in the long term* (Barbour 1999:16).

Leasing private lands and recruiting investment from external partners through joint venture could increase the area reafforested. More often than not, however, the attractiveness for external joint venture monies rests in the opportunity to own the carbon pool. It is this that can then be traded or used for industry benefit somewhere else. The benefit for FT is that establishment capital need not be sourced locally and the management cost of the resource can be shared.

There may also be the potential for establishing Kyoto eligible forests on existing FT lands or lands purchased by FT. This strategy could prove contentious, and may be seen as potentially conflicting with National Competition Policy or even the *Trade Practices Act 1974* (if government could be seen as unfairly participating in the market). In doing so, Kyoto forests owned by FT will need to be accounted for under some form of verification system, and then traded in an emissions market (either national or international). Currently there is a proposed national carbon accounting standard, the evolution of which is uncertain. Added to this, the Kyoto Protocol has not yet been ratified and there are substantial costs in establishing, maintaining and enhancing carbon stocks over and above other wood products. And, an emissions market may in fact never eventuate. There are potential problems with joint investment where, of two companies investing in a plantation, the forest owner may seek to distinguish between, for example, pulp production on cleared native forest, and that on previously cleared land so as to give those in the joint venture the benefits

of sinks, even though the carbon plantation investment is inseparable from overall environmental practices:

> *...post-hoc attempts to pick and chose previously cleared land... and delineate them as sinks is both unethical and a potentially un-auditable approach* (Cadman 2000:3).

The problems with disaggregating land ownership and therefore accreditation on a single property may even be problematic. On a single property it is possible to have native forestry and plantation established on cleared land for sinks. Cadman argues that a corporate structure makes it difficult to trace ownership and in the case study that he provides, the possibility exists where on one piece of land the existing native forest can be cleared, this space planted as well as the previously cleared space, then, after the fact, it may become possible to pick and choose the 'previously cleared land to designate the sink bits' (2000:11).

Another option the government could implement would be the establishment of plantings aimed at rehabilitation of degraded land by such measures as biodiversity enhancement or salinity reversal. This has the benefit that the planting would not be harvested and corresponding emission pentiles charged. Whilst the real economic value of the planting may be dramatically lower that a plantation aimed at wood products, the sale of the carbon credits being the only likely immediate economic return, multiple non-wood product values exist such as tourism and community well being. Considering the issues outlined above, however, along with trends in current forest management and preference for certain forms of capital, this option is not likely to become a policy reality.

Multiple difficulties arise with each option, particularly when attempting to deliver a viable resource to both sawlog users and other fibre markets. Drawing upon a range of evidence, Barbour notes that decay rates relating to plantation based wood products can be seen as oxidising rapidly (1-5 years for example in paper products), medium fast (5-10 years for example in ephemeral wood products such as pallets and posts), and slowly (10-100 years for example in treated, structural and furniture timber), and

that 'consequently the maximisation of carbon removal from the atmosphere through sequestration is controlled by the level of biomass attained by the community at a particular site, and the rate of decay of the plant material after harvesting' (1999:6). Whilst value added wood products are likely to store carbon for longer than fibre products because they have longer life cycles, cost of production and carbon accounting, impediments are great.

In its advice to private individuals, State Forests New South Wales also points out that practical application of current Kyoto rules means that:

> ... *the carbon sequestered in a planted forest is deemed to be emitted when the forest is harvested. This means if you sell carbon credits, you will have to either re-purchase carbon credits at the time of harvest, or replant the planted forest to ensure that the level of carbon that has been sold as a carbon credit remains sequestered in perpetuity* (State Forests NSW).

If carbon credits eventuate under a single international, or various national trading system systems they would need to be qualified in accordance with the Kyoto Protocol. A hectare of land can sustain a plantation of 250 – 400 trees depending on many factors including the rainfall, terrain, type of tree and plantation practices. An average plantation of 300 trees per hectare in Tasmania is assumed to be a reasonable estimate by FT (Eastment, pers comm, 1999).

According to 1999 estimates, it was believed that approximately 30 percent of FT's plantation forest could qualify for Kyoto forest. Effectively this means that 3,000 hectares of Kyoto forest could be established annually and be traded for carbon credits. FT also indicates that since 1990 40,000 hectares of hardwood and softwood trees have been established and that approximately 10 percent of this is on land previously cleared which could hence qualify for Kyoto forest. It needs to be considered, however, that of this (4,000 hectares of Kyoto forest), approximately 1,000 hectares of softwood plantation are under joint venture. This effectively means

that carbon credits are not available to Forestry Tasmania alone for trading. The remaining 3,000 hectares are hardwood plantation, and are available.

As part of the Forestry Growth Plan, Forestry Tasmania intends to establish 8,000 hectares new plantation per year, of which approximately 30 percent will be on land cleared prior to 1990. Based on past experience FT suggests that a plantation of 5,000 hectares each year is practicable and that this level of plantation should be permanently sustainable (Sharama, pers comm, 2000).

The average practical growth life of a hardwood tree is estimated at 60 years and that of a softwood tree at 27 years. On maturity, a harvested hardwood tree holds approximately 1 tonne and a softwood tree 0.5 tonnes of carbon. Thus, the carbon dioxide absorbed by 300 hardwood trees over 60 years is 300 tonnes, which equates to an average of 18.33 tonnes per hectare, per year. The softwood equivalent over 27 years for an average 300 tree plantation would be 150 tonnes - an average 20.37 tonnes per hectare, per year. The total likely quantity of tradeable credits from Tasmania's plantation estate can be extrapolated on the basis of these figures, and is analysed below.

Noting that between 40 and 73 percent of net primary production of biomass occurs within soil, Barbour suggests that:

> *... these substantial differences in primary production between native forest and plantation monocultures, have huge implications for the use of carbon sequestration, as well as on other issues concerning the environment and society... it is the average biomass that is attained by a forest that dictates its effectiveness as a carbon reservoir, and not the growth rate of the species being grown... a short rotation time does not increase average biomass* (Barbour 1999:11-14).

Bearing this in mind, a Greenhouse Sink Analysis for Tasmania has these characteristics:

- the average annual plantation in Tasmania is estimated at 10,000 hectares and includes both public and private forests. An estimated 30 percent of the plantation forest will qualify for Kyoto forest; that is, 3000 hectares will become Kyoto forest each year;
- Forestry Tasmania estimates that in the Kyoto forests, 80 percent will be hardwood plantation and the remaining will be softwood. This means that 2400 hectares of hardwood and 600 hectares of softwood Kyoto forest plantations will be established each year. Forestry Tasmania's softwood plantation is under joint venture and hence its share of softwood is not available for trading; and
- the estimated greenhouse sink potential in the annual 2,400 hectares of hardwood plantation is 44,000 tonnes whilst in the annual 300 hectares of private forest softwood plantation it is 6,100 tonnes. In total, therefore, the annual addition of sink capacity would be approximately 50,100 tonnes of CO_2. While estimates range of the value per tonne of carbon, at an estimated price of $US10 per tonne of CO_2, the value of annual sink capacity addition is worth $US715,000 – approximately $1.4 million Australian (assuming USD = 1.96990 AUD).

To sum up: Kyoto rules would limit allowable sinks to forests established since 1990 on land that has never been forested (ie afforestation) and forests established since 1990 on land that had been historically cleared (ie reforestation). However, sequestration through replanting areas that were forested in 1990 would clearly not qualify and sequestration by other trees, including naturally occurring native forests, would not qualify (Sharma, pers comm, 2000). It must also be remembered that:

- only changes in eligible carbon stock that occurred during the Kyoto Protocol commitment period, 2008 to 2012, can be counted in that period;
- eligible sequestration in any subsequent commitment periods can be counted in those periods; and
- sequestration of emissions that occurred prior to 2008 cannot be counted, even if they occur in Kyoto forests (AGO (c) 1999:27).

And also:

> *The cost of purchasing a carbon credit at harvest time will depend entirely on developments in technology. Revenue from the sale of timber products would be available to offset the purchase of carbon credits. So the decision on whether or not to harvest will depend on the relative value of timber and carbon at the time...* (State Forests NSW).

Clearly the value of carbon credits will be a critical determining factor for harvesting and plantation investment. In a background of global pressure and possible corporate commitment to the Kyoto Protocol, decisions will be based on the value of carbon sequestration. Estimates have ranged anywhere from $10 per tonne ($CO_2$ equivalent) to $60 per tonne. Whilst trading has not commenced and the Protocol not yet ratified, sink investment will remain high risk until trading commences in some form or other. Whilst the Sydney Futures Exchange has been established for carbon trading, the system will take some time to gain momentum and maturity.

4.6 Conclusion and EM discussion

In summary, the potential greenhouse and biodiversity conservation benefits resulting from carbon sink investment are likely to be limited and therefore a potentially unsound driver of policy objectives. This chapter has shown that management of state forest lands has been controversial from a conservation perspective and constrained by resource access and fibre markets for decades. Whilst these trends have become incrementally significant over time, so too has been the adoption of an environmental discourse and sustainable policy rhetoric which supports the continuation of traditional economic regimes with little or no change. The residue markets dominating concession regimes of the 1930s to 1990s gave way to supply agreements committing supply of fibre for up to ten years. As the nature of the resource changed, new lifeblood has been sought. Value-adding opportunities include pulp mills, fibreboard manufacture and more recently 'renewable' energy power generation.

These changes have meant significant investment in a discourse that promotes the benefits of rapid growing short rotation monoculture forests, and the picking up of all

opportunities which provide an appearance of environmental benefit. Greenhouse policy and carbon sink potential provide an ecological spin and investment attraction which may be little more than elaborate discourse in nature. Carbon sink policies can be seen as an instance of EM in practice wherein regional economies such as Tasmania embrace the opportunity of a new official policy rhetoric at the behest of international regimes and national negotiations. This is done in the hope of technological innovation and greener end-of-pipe technologies to provide solutions to regrowth veneering, pulp and paper production and biomass power production which will maintain current levels of market activity. The hallmarks of EM have been shown to be present; indeed, greenhouse provides a good instance of EM uptake within business and government. Evidence presented also highlights how policy intention expressed in ecological terms may not necessary translate into real environmental benefit. Again, forest related greenhouse policies are shown to be characteristic of this problem.

If and when an international emissions trading system is developed, the likely opportunities for Tasmania to benefit from its existing forest estate, or new forest estates, will be very limited. Added to this, establishing scientific and verifiable carbon sequestration in order for carbon accounting to occur is extremely technical (as we have seen). On the basis of the evidence presented here, there seems every likelihood that the cost of employing this expertise is likely to be greater than the value of a tonne of carbon stored.

This case study illustrates the likelihood that carbon sink potential in Tasmania, and those seeking to exploit it, are on a demonstrably weak tangent of ecologically modernising business. This is because of the substantive lack of real greenhouse driven investment opportunities that deliver genuine environmental benefits. This demonstrates evidence of weak EM as opposed to strong and reflexive EM, with commitment largely at the level of rhetoric, where its deployment is essentially manipulative. In closing this chapter it is well, too, to point to the wider context in which this Tasmanian case study ramifies. As Cadman notes:

The question must be asked: if carbon credits are enhancing investments that may encourage native forest destruction in industrialised first world countries, then surely there is an even greater risk that in poorer countries... the potential for perverse outcomes is even higher? ... not only are sinks a questionable method of addressing climate change, but they may also lead to negative environmental outcomes... (2000:4).

5. Renewable Industrialisation?

This chapter provides a second case study to assess the currency of EM, and the nature and extent of the uptake of EM principles such as a sustainable development ethic and an advanced environmental consciousness, through the exploitation of greenhouse opportunities in Tasmania. In this instance the focus is on the state-owned electricity businesses and the emerging renewable energy opportunities being created by international and national greenhouse policies and programs.

In examining the way that these businesses are currently positioning themselves to take advantage of 'greenhouse' business opportunities, it is necessary first to outline their environmental record in terms of the traditional roles that they have played in balancing energy demand and supply within the state. As with the previous case study, this background will put in context the degree to which EM is occurring in the area of Tasmania's energy policy. Consistent with the approach taken in the previous chapter, this section of the thesis will proceed with a brief outline of the historical experiences and contemporary trends in energy policy in Tasmania. This is followed by an explanation of the potential competitive advantage Tasmania might have by virtue of its substantial past investment in renewable hydro-electricity assets.

The second part of this chapter will explore business development incentives for renewable energy development contained in the Kyoto Protocol and contemporary Australian greenhouse policies. With this international and national policy background, the extent to which the potential greenhouse competitive edge is being exploited by the Tasmanian government or its energy businesses is explored. Finally, this chapter will examine whether these instances evidence EM occurring, and the degree to which any such occurrence of EM represents a genuine transition toward more ecologically sustainable policies and values, as opposed to a mere rhetorical exercise geared to maximising potential advantages from unintended and incidental environmental benefits of previous energy planning decisions. This will enable interpretation of associated environmental discourse and policy rhetoric, and

exploration of whether a strong or weak ecologically modern ethic is present in Tasmania's current energy policy.

5.1 Historical Development and Management of Public Hydro-Electicity Assets in Tasmania

Approximately 60 percent of Tasmania's stationary (non-transport) energy requirements are supplied from hydro-electricity. The energy supplied from these hydro-electricity assets is portrayed by the Tasmanian government and government-owned business as a 'renewable', 'clean and green' electricity source. Much is made of this in marketing Tasmania and its tourism (Department of State Development(b) 1998:31). Behind this official view, however, lies a rich history which is important to any understanding of the capacity of the state's electricity business to 'sell' its product and its image as renewable, clean and green. A snapshot history of Tasmania's hydro-electricity assets and the associated role of government energy policy (in its various forms) will establish a context in which to discuss the extent of environmental learning in the contemporary government business enterprise of Hydro Tasmania ('the Hydro' or HEC). The history of the Hydro is replete with both pride and conflict and as a result there now exists a substantial body of historical literature now exists providing accounts of its history (Knight, Benjamin and Colebach [1962]; Australian Conservation Foundation [1972]; Kirkpatrick [1979]; Thompson [1981]; Gillies [1984]; and Read [1986]). This section draws heavily, but not exclusively, on the most recent and perhaps most comprehensive addition to this corpus of literature, Lupton's *Lifeblood: Tasmania's Hydro Power* (2000).

Dominant themes in these historical accounts of the Hydro are the degree to which the production of hydro-electricity was primarily a tool for industrial development and the close relationship between industry and the Hydro. Thompson, for example, noted that:

> *The key to understanding the HEC's power in Tasmania is to examine it's relationships with industry. Tasmania is effectively a hydro-industrial*

complex. Since the establishment of the HED in 1914 the aggressive marketing of electricity to large industrial consumers has been the lynchpin of Tasmania's economic progress. Cheap and abundant electricity brought industry.... These became the heavyweights of the Tasmanian economy... handicapped by the difficulties of a small home market and a 240km stretch of water separating it from the mainland... (Thompson 1981:23).

The Tasmanian Government became actively involved in developing the island's hydro-electric resources in 1914 when it stepped in to take over a failed private enterprise project aimed at harnessing the water resources of the Central Plateau to generate electricity (the Great Lake scheme). The Hydro Electric Department (HED) was created to ensure that the project started by the failed company was completed (Gillies 1984). This 'nationalisation' occurred within an economic climate where it was envisaged that the provision of cheap electricity could attract energy-intensive mining, metals, mineral processing and chemical companies to Tasmania. The presence of these companies, it was envisaged, would establish a firm economic basis with employment and growth in the state. The HED was seen as, and saw itself as, both a saviour and magnet for manufacturing business that would provide employment and revenue for the state. In return, those companies would be supplied by the HED with cheap, reliable sources of power. The 'hydro-industrialisation vision' was that these large energy intensive manufacturing businesses would create a development environment conducive to smaller manufacturers for whom energy was not a major cost item. Embedded in this strategy was a presumption of a rolling program of hydro-electric development. As one enterprise was established or expanded in the state and took up the surplus capacity of electricity, more electricity would be required to provide for potential new industries, so a new hydro-electric project would be needed to ensure that there was sufficient surplus of cheap electricity to attract new industry, and so on *ad infinitum*.

The HED's vision, however, proved elusive, and industries were slow to arrive. In 1930 the HED was restructured to become the Hydro Electric Commission (HEC), and the Hydro Electric Commission Act 1930 effectively provided the Commission

with legitimate independence from the persuasive influences common to politics, as well as the ability to control and use water resources to maintain the development paradigm the HED had so firmly established. A subsequent parliamentary Act consolidated the HEC, as well as making provision for state control over all waters, including lakes, falls, rivers and streams (Thompson 1981:16). This involved an enhanced charter to coordinate the activities relating to generation, transmission, distribution, retailing and marketing of electricity within the state. In the early 1950s, the HEC was handed absolute monopoly on all aspects of electricity from the planning stage right through to the retail stage. This allowed the HEC a greater capacity to coordinate its core activity of organising for the production of large amounts of cheap electricity in order to attract potential industry. Lupton notes that the intent of the 1930 Act was to organise relationships of responsibility to Parliament so that its business could not be hindered by governments of the day seeking short term political gain 'to the determent of the state's long term interests' (2000:296). This security was mirrored in some of the HEC's major supply contracts, which contained sovereign risk clauses to insure the supply and price that won the business development in the first place, against changing governments or political whim.

The HEC's dream of hydro-industrialisation was eventually realised by attracting, not labour-intensive manufacturing industries, but footloose energy-intensive industries. These industries sourced their primary inputs from outside the state and relied, in producing exportable outputs, not on labour but on large quantities of cheap electricity. Subsequent expansion by these industries put in train a series of electricity demand forecasts which committed the HEC to a continuous rolling construction program which inevitably became institutionalised as the Commission's *modus operandi*. By the 1950s the HEC accounted for nearly three-quarters of the state's debts and loans. It could generate water-based power for the manufacturing sector at the expense of water supply for rural industry irrigation. It had the power to alter river flows and catchments. As these activities expanded they increasingly encroached upon pristine natural ecosystems. This led to increasing conflict, which reached a new height when it was discovered that one hydro-electric scheme (the Middle Gordon Scheme) would inundate an entire National Park (Lake Pedder National Park). The power held by the HEC was unprecedented. As Lupton notes:

> *The HEC became the pivot of the public sector in Tasmania... it became more powerful perhaps than any other government instrumentality that Australia had known in times of peace* (Lupton 2000:8).

A consequence of this was social upheaval, including two well-documented and iconic environment/development conflicts. The first of these began in the late 1960s when the HEC commenced work on the Middle Gordon Power Scheme which involved, among other things, the inundation of Lake Pedder in 1972. While the HEC viewed this as 'collateral damage', the controversy over the issue gained such momentum as to call into question both the powers of the HEC and the key political assumptions of the day. A dedicated environmentally conscious segment of the community was politicised and a potent conservation movement evolved. The flooding of Lake Pedder became a critical historical point in mobilising the contemporary environment/green movement. It stimulated previously disparate interest groups such as the South West Action Group and the Lake Pedder Action Committee, to consolidate and emerge as the United Tasmania Group in 1972 - the first green party in the world (Walker 1989). From the United Tasmania Group emerged the Tasmanian Wilderness Society (1975), which became a formidable opponent of hydro-industrialisation:

> *So it was that the Australian stronghold of hydro-electricity became the political stronghold of one of the most influential green movements in the world... The plan to flood Lake Pedder became a political storm. Later, the proposal to flood the Lower Franklin River produced not just a storm but a tempest that spanned the continent* (Lupton 2000:9).

In trying to save the wilderness, proposals for alternatives to large hydro-electric schemes were advanced by sections of the environment movement. These included not only energy conservation and wind, but also a coal fired power plant. This provided the HEC with an opportunity to sell its favoured option in terms of environmental benefits and the Commission seized the opportunity by adopting the slogan 'HEC: Power without Pollution' and 'Hydro is Solar' (Harries, pers comm,

2001), whilst side-stepping the charge of environmental vandalism associated with the destruction of wilderness areas. We have here an early example of EM behaviour on the part of the HEC.

Lupton also provides an account of the 'Fight for the Franklin', the second pinnacle historical event, which followed the announcement of the second stage of the Gordon River Power Development - specifically, the proposed construction of the Gordon-Below-Franklin Dam, in 1979. The scheme, if it had been constructed, would have increased the state's hydro-generation capacity by 22 percent, at an inflation-adjusted cost of $1.4 billion (2000:303). Instead, the proposal to flood the lower Gordon and Franklin Rivers re-ignited the controversy of hydro-electric development. The scale of protest was unprecedented and blockades occurred at the proposed dam site. The accounts of this controversy are numerous and stand testament to the significance of the events. The 'green movement' successfully campaigned on both emotional and hard economic grounds and engaged in a battle that would see the wilderness eventually recognised as a World Heritage Area and the declaration of the Wild Rivers National Park. The result, according to Lupton, was that 'all told, a potential annual energy output of 3,161 gigawatt hours had been locked up in World Heritage Area' (2000:328).

With a change from Liberal to Labor government in Canberra, the latter having campaigned on a promise to save the Franklin, the Dam was stopped. The controversy was ultimately decided in 1983 by a 4:3 decision of the High Court of Australia, in which the Commonwealth's constitutional power to halt construction of the dam, under its international treaty obligations arising from its signature to the World Heritage Convention, was upheld. It was the world's first internationally-scaled wilderness preservation controversy, whilst in Tasmania itself the battle led to the establishment of the Tasmanian Greens, a political party which went on to hold the balance of power in the Tasmania Parliament from 1989 to 1991 (Hay 1998:103). The HEC and its business activities had inadvertently created a world renowned environment movement that was committed to principles well beyond those of ecologically modernising institutions.

5.1.1 Restructures and Privatisation of the Hydro Electric Commission

The creation of a potent environmental movement was an unintended consequence of hydro-industrialisation. Behind the environmental debate were also economic critiques of energy planning and nascent moves to restructure the industry along the lines of an economically efficient model. The environmental movement itself mooted some of the initial moves towards restructuring and reform.

In the decades following these key environmental disputes, the HEC underwent significant organisational change, including numerous business restructures. It will be shown that these changes have been constrained by accumulated policy debt and reform, ultimately restricting the ability of the Hydro to be a genuine example of reflexive EM. The dominance of the Hydro in Tasmania's economy was earned through the historical ability to attract large energy intensive industry through the competitive price advantages it once had to offer. Challenged by the environment movement, in little over a decade commentaries evince the Hydro's learning of an environmental discourse.

> *Care for the environment had been accorded an increasingly high profile in the Hydro's pronouncements ever since the Pedder and Franklin debates made it a powerful and political issue. Now the seriousness of their commitment, made explicit in the 1987 Corporate Charter, was matched by changes in which Hydro went about business* (Lupton 2000:357).

The Hydro Charter 1987 included goals such as provision of electricity to the community at the lowest practical cost, encouraging the development and efficient use of energy resources (including wind, wave and solar power), and advising on policies that, through efficient resource use, promote commercial and industrial development. With the Charter in mind we can consider what EM has to offer in terms of distinguishing rhetoric from reality in assessing corporate behaviour.

13 January 1997
Christine Milne
Leader of the Tasmanian Greens

DISAGGREGATION VITAL TO ECO-INDUSTRIALISATION

The Tasmanian Greens today said that the recommendations of the National Competition Policy Review of the Structure of the Hydro-Electric Corporation's Distribution and Retail Businesses, provided sound reasons why the HEC should be disaggregated.

Greens Leader Christine Milne, said that for decades the HEC ran rough shod over Tasmania but through disaggregation would finally be brought to heel.

"The break up of the Hydro is the final phase in the Greens campaign to bring it to heel," said Greens Leader Christine Milne.

"Tasmania can move into a new era of energy efficiency, energy conservation, co-generation, and genuine innovation."

The Tasmanian Green recognised their debt to the HEC, stating there may not have been a United Tasmania Group or Tasmanian Greens without the past excesses of the old monolith, but felt it was high time for Tasmania to move forward to a new era of eco-industrialisation.

"As we move into the next century and next millennium it is time to leave the dominance of the Hydro behind as we move into a new era of eco-industrialisation."

"It would be easy for the Government to structure the break-up to favour a sale, or Basslink. Our job will be to ensure the break-up is the best for Tasmanians, whatever the future may hold."

The Greens moved amendments to the Government's recently passed disaggregation legislation to ensure that the final breakup would come before Parliament for scrutiny, thus giving the Parliament the benefit of the National Competition Policy review released today.

Source: The Greens 2000

A mandate such as the Charter, combined with an historical approach described by Lupton as the Hydro's 'Wild West frontier' (2000:363), means that the comparative importance given to promoting development over encouraging efficiency needs to be carefully considered. The legacy of the 'Wild West' development paradigm matched by the political desirability of winning large energy-intensive projects, is arguably still considered the pinnacle of political achievement and such industries as the mainstay of the Tasmanian economy.

Thompson, in his account during the Franklin debate, suggested that the HEC was one of the most powerful and controversial institutions in Australia. Its policies had led to the destruction of Lake Pedder and were responsible for Tasmanians being the largest consumers of electricity in the world. According to Thompson: ' ... the Commission should either be disbanded or split into two separate authorities' and that failure to do so 'would ensure the construction arm of the HEC continues to dictate Tasmania's energy policy' (1981:162).

Calls for restructuring were therefore first mooted by the HEC's environmental opponents, who believed that the restructuring of their arch-rival would result in an emasculation in terms of its

political power. And, restructuring did occur - Lupton notes that in the early months of 1988 the Hydro's old and established engineering-based management structure was 'obliterated altogether' in a new wave of commercialisation.

Ironically, this restructure was driven by Premier Robin Gray's refusal to be dictated to by a government instrumentality, even though this same instrument largely secured his gaining of the Premiership in the first place. The changes were also driven by the state of the HEC's coffers and the cost of its loans after the Australian dollar was floated in 1983. The common perception is that the restructure, along with the winding down of construction, meant that the culture of hydro-industrialisation of the previous decades was all but over.

But the demise of the power-engineering branch within the Hydro did not, contrary to the view of many contemporary writers, constitute an end to hydro-industrialisation. Evidence of the hydro-industrialisation ethos continued to surface throughout the 1980s. It was a decade of drought, which cost the Hydro $3.6 million in fuel oil to fire the backup Bell Bay power station. In pushing for restructuring the Greens failed to see that the economists waiting in the wings would seize upon the opportunity to create an electricity market and to drive reform to a point where electricity businesses were reduced to commercial activities competing aggressively for profit and market share. Energy efficiency and demand management did not fit into this commercial ethos. This was, more generally, a decade that saw a shift towards commercialisation, a phase which also saw the undoing of campaigns such as 'Switch Off and Save' which amounted to what was considered a decade of inactivity (by encouraging people to use less electricity in their homes) in the domestic market (2000:363-73), and its replacement by what might be seen as a 'switch on' campaign characterised by attaining comforts 'for only 5c a day'. This commercialisation process accelerated toward the end of the decade and in 1990 Tasmania, in line with moves being made in other Australian states, introduced an Authorities Financial Management Act (SAFMA 1990) which effectively served notice on government authorities, such as the Hydro, that they had to behave as a profitable arm of government yielding their owner a dividend (2000:372). Furthermore, under the Labor minority government, the

Department of Resources and Energy had been set up and for the first time the Hydro had to work with government in assessing energy options.

The balance of power gained by the Tasmanian Greens and Labor in 1989 ended acrimoniously in 1992. An election saw the reins of power passed to the Liberal Party. Robin Gray, who came to power as Premier of Tasmanian as a pro-dam politician during the Franklin dispute and was renown for his pro-development stance and uncompromising support for the dam, became the Minister responsible for the energy portfolio. During his Premiership in the 1980s, further dam options had been explored and developed (including the King and Anthony Scheme, the building of which started in 1984) and are said to have provided enough surplus power to 'turn around' the business.

> ... *additional revenue lay not in raising prices and driving customers away but in lowering them and increasing consumption. Thanks to the Anthony Power Development, the Hydro now* [by the early to mid 1990s] *had the largest reserves of energy in History....* (Lupton 2000:398).

By the time the King and Anthony Scheme came on line (in the early 1990s), it had become patently obvious that construction of hydro-electricity schemes was not a cost-effective option for the future. Further hydro development was prohibitive and during this phase the Tasmanian government and the Hydro explored such future energy possibilities as natural gas and an undersea electricity cable link to Victoria, an idea which had first emerged in the 1950s (2000: 373-385).

Although the omission of further hydro-electric schemes from the list of options was explained on the grounds that the cost-effective options had been locked up in World Heritage Areas, the reality was that the cost of electricity from the last scheme, the King and Anthony-Henty schemes was 11c/KWh, approximately 2½ to 3 times the cost of electricity produced from new coal and gas fired power stations on mainland Australia (Harries, pers comm, 2001). While there was a shift from hydro to other energy options, the steadfast commitment to an ideology of growth, and the political

validity of big projects, remained as strong as the 'Utopian Dream' development ethic of the late nineteenth century (Lupton 2001:385).

At the same time as the 'big energy project' ideology appeared to be regaining strength, the Hydro was attempting to ecologically modernise itself. Initially driven by public relations, it was quick to recognise that environmental credentials had the potential to translate into not just good public relations or compliance with law, but new business opportunities. While the Hydro of the 1970s and 1980s paid more than lip service to environmental concerns (Lupton 2000:390), it was not much more than lip service. Lupton himself points out that the Hydro lacked at the time any formal environmental policy (2000:390). However, the HEC cobbled together a formal environmental policy, padded with conciliatory rhetoric to the tune of '... the days of confrontation are over...' (2000:392). This new voluntary environment policy put in place a number of follow-up procedures and assessments that served, ironically, to highlight several shortfalls in the new eco-focussed business. A series of audits carried out under this policy revealed that the HEC owned a host of contaminated sites, pointed to a series of failed rehabilitation attempts, and revealed numerous other general operational inefficiencies. The Hydro was forced to respond by adopting an environmental management system consistent with the international standard ISO 14001. Implementation of this standard involved significant costs for consultancies and rectification programs.

Further restructuring, downsizing and outsourcing of the Hydro occurred in the mid to late 1990s. In 1997, the Liberal government announced the split up of the Hydro into three separate business units: the Hydro (generation); Aurora (distribution and retail) and Transend (transmission). Arguably, the real driver of this change was Treasury's plan to sell the Government's electricity assets and to maximise the sale price by selling these as three separate businesses. This was well suited to the Liberal Government's philosophy of getting government out of running business.

Whilst the government saw the opportunity to divest itself of ownership of businesses, Treasury saw the opportunity to reduce state debt. But the government did not anticipate massive public opposition to the sale of the Hydro. The Greens and the

Hydro combined to oppose the sale (and indeed, Robin Gray, the Minister for Energy, publically supported the Hydro against the Premier). The Government responded by watering the proposal down to a strategy of partial sale. This was sold to the public as necessary to reduce state debt. The voting public, however, rejected even the partial sale option. In 1998, a Labor government was sworn in with a landslide victory, its primary campaign platform, the retention of the Hydro in public hands, winning the overwhelming support of a majority of Tasmanians.

Considering the Hydro in the context of environmental consciousness and politics in Tasmania raises a myriad of possibilities in relation to EM: the uptake of EM as a doctrine; the recognition of EM characteristics; and the question of 'genuineness' in environmental reform. The common view is that hydro-industrialisation died in 1983 and that the HEC subsequently underwent a conversion on the road to Damascus, a major change in its culture, injecting environmental concerns into its day-to-day activities and management. The reforms of the 1980s and 1990s evince a number of core characteristics:

1. the public clearly wants to retain the Hydro in public ownership;
2. the Hydro has undergone major restructures and now operates as a commercial business;
3. government wrested energy planning away from the Hydro then sought to hand it over to 'the market';
4. the popular view is that hydro-industrialisation is dead and buried; and
5. the Hydro has ecologically modernised itself.

The validity of these views will be tested in the following section by questioning, in particular, the fourth and fifth of these - analysing the way in which the HEC has pursued its new corporate goals with a new environmental ethic based on a greenhouse sensitive future, and the parallel advantages and constraints available in greenhouse policy frameworks. With this established, the core drivers of policy development and the extent of change can be assessed.

5.1.2 Competitive Advantage – Historical Accident or Growth from Green Credentials?

Ecopolitical commentary in Tasmania over the past three decades has characteristically echoed three themes:

- *the uniqueness and emergence of the first green party in the world, the United Tasmania Group, and further green political development;*
- *the uniqueness and magnitude of the state's natural environment; and*
- *political, social and economic agendas that have undermined the dominant economic development paradigm driving the state's economy - hydro-industrialisation.*

Crowley for example, suggests that 'hydro-industrialisation functioned as a policy framework, shaping not only Tasmania's industrial profile, but also the nature of its industrialised communities' (1989:48). While commentators such as Crowley describe hydro-industrialisation as a 'development relic of the past', this view is based on a narrow interpretation of hydro-industrialisation. A broader interpretation would allow a different thesis to be put forward, namely that the underlying ideology and dominant development paradigm did not in fact die or even atrophy following the Franklin Dam episode, but survived by adopting a specialised environmental position sympathetic to development. This thesis accords with the central thesis of EM – that capitalism, as the dominant economic paradigm, can pursue environmental stewardship.

The brief historical overview of the Hydro provided above highlights the major schism between the environment movement and hydro-industrialisation as observed by several ecopolitical commentators during recent decades. The following sections will discuss how, in the current economic, social and political environment, the transcendence of hydro-industrialisation from its traditional character to one of environmental consciousness expressed through a greenhouse sensitive discourse has arisen. It will explain how elements of greenhouse development provide a new discourse, and how, because of this, the common tendency to refer to hydro-industrialisation in the past tense is in fact inaccurate. It will be shown that

greenhouse has provided what appears to be a turnaround in the environmental discourse of the once core enemy of environmentalism in Tasmania.

The extent to which this institutional learning reflects more than rhetoric can be assessed within an EM framework, by asking three key questions:

I. *will/has the consciousness of the environment movement become benign to past hydro-industrialisation, so that environmental damage done in the process of constructing past schemes is accepted or forgiven, thus that these schemes are now seen as 'good' on the basis of being renewable?; or*

II. *is it that what has been perceived as the real task of the green movement has been won, on the energy front at least, and that its once true enemy will, in a benign capacity, adopt a real and measurable environmental paradigm?; or*

III. *does the new, renewable industrialisation of Tasmania constitute an example of Welford's (1997) hijacking of environmentalism – as discussed in Chapter 2.*

In his *Competitive Advantage of Nations* (1990), Porter argues that stringent environmental regulation can lead to the export of those products which are thereby promoted. Those countries that have most rigorously attempted to curtail air pollution, for example, have become global leaders in the export of pollution control technologies. Porter further notes that:

> *The strongest proof that environmental protection does not hamper competitiveness is in the economic performance of nations with the strictest* [environmental] *laws... Turning environmental concern into competitive advantage demands that we establish the right kinds of regulations... They must stress pollution prevention rather than merely abatement or clean-up. They must not constrain the technology used to achieve them, or innovation will be stifled. And standards must be sensitive to the costs involved and use market incentives to contain them* (Porter 1996:34).

Reflecting an ecological modernisation framework, Porter's competitive advantage thesis interprets the relative positioning of units (such as nations, industries or businesses) to their environment and the outside forces (threat of new entrants; intensity of rivalry; pressure from substitutes; and the bargaining power of buyers and suppliers) that act upon it. Competitive advantage can be captured either by using the environment or by using merely environmental concerns held by consumers as the basis for acquiring comparative strength. *Relative* strength is a critical dimension to successful exploitation of environmental assets or acumen, and as competitors become increasingly ecologically conscious, credibility becomes a core business element. The relativity concept parallels expressions of weak and strong versions of EM - weak business-as-usual involves environmental retro-fitting (which most competitors can do); whilst strong environmental performance is based on verifiable procedures and demonstrative systemic ecological commitment (which many competitors will not manage).

There is a dilemma, however, with which EM is not easily reconcilable. EM theory (in a prescriptive sense) does not readily recognise that the weakest expressions of EM (in a descriptive sense) can provide greater relative competitive strength than is recognised. This can undermine EM prescription as a force for positive environmental reform. For example, it is in peripheral economies where the most intact ecosystems are likely to be present (because of a lack of development), and correspondingly, it is in these places that environmental decline is likely to be greatest when economic development occurs. As a case in point, Tasmania boasts some of the most unique wilderness assets in the world, and these attributes are exploited throughout the economy to gain strategic competitive environment. The presence of the 'best' wilderness is no guarantee that Tasmanian businesses are examples of genuine environmental stewardship, but it still provides competitive edge. The need to espouse a stronger form of EM is particularly acute in the presence of scarce environmental assets, but it is likely to be passed over in favour of weak EM when business are already hampered by pressures such as global commodity prices, and this is typically the case in countries with peripheral economies and comparatively intact ecosystems. In peripheral economies, because of external economic pressures, the most efficient business tactic is to environmentally 'badge' goods and services,

continuing environmental destruction while still promoting an environmentally sustainable rhetoric for competitive advantage. This characterises an almost systemic inability to ever develop strong EM within economies where the most critical ecological resources are likely to reside. More developed economies with more compromised ecosystems, on the other hand, have an incentive to espouse stronger forms of EM, to make up for the absent resources and to seek competitive strength.

Thurow (1999) explores the way that knowledge can be used to build wealth as opposed to more traditional capital, including industrial processes and land. The first industrial revolution saw structured technological advances combined with the 'birth of the corporate research laboratory' (1999:1), the second saw electrification and the third revolution is based on cultural capital/knowledge. Competitive advantages gained through the previous industrial revolutions harnessed radical methodological change and innovation, and the third is not dissimilar. Thurow argues that in each revolution success has emerged through disequilibrium conditions which emerge and collapse as technologies and ideas mature (1999). Like Porter, Thurow sees disequilibrium as a potential threat as well as a potential opportunity or competitive advantage.

Thurow's 5 Rules:

1. *No-one ever becomes very rich by saving money*
2. *Sometimes successful businesses have to cannibalise themselves to save themselves*
3. *Two routes other than radical technological change can lead to high growth, high rate-of-return opportunities: sociological disequilibriums and developmental disequilibriums*
4. *Making capitalism work in a deflationary environment is much harder than in an inflationary environment*
5. *There are no institutional substitutes for individual entrepreneurial change agents.* (Thurow 1999)

Competitive advantage in the second industrial revolution in Tasmania was obtained through the provision of hydro-electricity. Contemporary competitive advantage is being sought through knowledge of environmental discourse and couching the Hydro in a new light. Indeed, Tasmanian GBE examples explored in this paper have shown that the ability to adopt environmental rhetoric has emerged out of historical accident, or disequilibria of development and environment. Because of the tenuous nature of

this management change, the environmental stewardship rationality may prove to be as much a threat as an opportunity.

Porter and Thurow provide a context that encapsulates the greenhouse dilemma for Tasmania. The historical disequilibrium of an industrial base that was once competitive, attracting major electricity consumers based on reliable, low price, bulk supply, is no longer. The Tasmanian government, having invested heavily in infrastructure (for which it is still paying), established itself with a monopoly resource for which the fuel was free (as long as it rained), and could be stored for long periods of time, thus providing a reliable capacity. It saw hydro-electricity as strategic, with the capacity to underpin growth. The same situation can be seen to be at work, now - however, the state's energy system is now capacity-constrained and suffering price competition within the national energy market. In this situation, the Hydro is attempting to use a reworked development discourse to portray itself as a green industry with a huge potential marketing advantage. Greenhouse allows for optimisation of this contingent disequilibrium, as the value of renewable energy is being recognised and massive investment is being made in these technologies worldwide:

> *Even today, renewable energy is Europe's fastest-growing source, and California gets 9 percent of its electricity from renewable sources other than hydroelectricity. The world's fastest-growing energy technologies, outpacing even energy savings, are wind power, increasing about 26 percent a year, and photovoltaics...* (Hawken et al 2000:247).

5.2 Renewable Energy Development Opportunities: Emssions Trading, Renewable Energy Certificates and Flexible Mechanisms under the Kyoto Protocol

We now turn to how the Hydro implements its newfound environmental concerns within a greenhouse context. To do so, we must identify the greenhouse opportunities that exist for the organisation. The difficulties associated with identifying greenhouse

opportunities with any precision, and the need for social values to be considered to establish the validity of 'the greenhouse industry(ies)', were discussed in Chapter 3. Global, national and state-based responses to the 'greenhouse' phenomena have also created too many associated business opportunities for a fully comprehensive account to be possible. However, at a more general level, much useful observation can still be made.

The Kyoto Protocol has itself in part given rise to this plethora of responses, by its extremely general nature, and through the flexibility of the mechanisms it proposes to reduce the costs of achieving national targets. This has stimulated considerable speculation over the opportunities for profit and capital growth from GhG abatement, all qualified by further speculation over whether the Protocol will be ratified or not. One important area of speculation has been the possible creation of a market for emissions or carbon credits. A difficulty is how carbon (and indeed other GhG) abatement would be treated ahead of the actualisation of such a market, and whether early abatement action would be accredited. This question is relevant because trading in carbon emissions is evolving in the absence of government decisions and ahead of any decisions about how such early responses will be treated or, indeed, in the absence of any certainty that the Kyoto Protocol will even be ratified.

There are a number of potential risks involved in early action. It is risky because not only do companies not know if they will be accredited for such action, but also the cost-benefits are unknown. Despite these risks, both governments and businesses are engaging in early action and the sale of potential carbon credits that might be earned from such action. This contains a potential risk because, if credit is given for early action in a fictitious market, the real dollar value will be unknown. Carbon values are likely to be either under or over priced in the first instance, and until an emissions market matures (and opportunities for credit become either ubiquitous or rare), the real economic value of emission credits cannot be realised. This raises questions as to why both governments and businesses are already selling potential assets.

The complexity of the artificial markets evolving from a greenhouse context can be further evidenced by the fact that economic benefits from emission reductions (through avoiding potential emission penalties or carbon sequestration) are also possible. Thus, potential tradable credits might be gleaned from technologies which can capture and store, or sequester, carbon or, where a business is allowed to emit a certain amount and actually emits far less (thus creating an emissions surplus), such a business may be able to transfer its pollution right to another party. A third opportunity is the development of renewable energy and other technologies which displace the use of GhG intensive fuels. These technologies include co-generation, shifting from carbon intensive fossil fuels to less carbon intensive fossil fuels (such as from coal-fired electricity to gas-fired electricity), and bio-energy. Mechanisms such as the Kyoto Protocol have attempted to present to business as many wins as possible, such as the potential 'double dividend' of realising credits from creating carbon pools, as well as savings in energy efficiency, or investing in fossil fuel displacing technologies such as renewable electricity.

Carbon Credits Are The Newest Market

... There even may be speculators trading on the "carbon market" within a decade, a market some analysts believe could be worth $700 billion by 2010... many over-the-counter deals are being struck between forestry bodies and business... Many industries realise they may be economically exposed in a carbon constrained future and are getting their credits before the first round of Kyoto-commitment analysis between 2008-12... (Australian 1999).

The Commonwealth has recently created an incentive for the second strategy (that of shifting to less carbon intensive fuels) in the form of renewable electricity legislation. The legislation (Renewable Energy Act 2000) creates an obligation on electricity retailers to purchase 'new' renewable energy and, therefore, it also creates a market value for the renewable energy above the normal price for the physical electricity. The difficulty however, has been how to define 'new renewables'. A similar problem occurs in relation to another renewable energy program, the *GreenPower* program. The attempt to reach agreement on what is and what is not *GreenPower* has been dogged by problems. Considerable controversy, for example, exists as to the efficacy of labelling steam-generated power from the burning of harvested forest residues as 'green'. The argument is that in order to be classified as green or renewable, the

forests from which the residues are sourced would need to be sustainable managed. This in turn creates a need for agreement on what does and what does not validly constitute sustainable forest management. On this question there is no consensus. A second debate revolves around whether the negative environmental impacts of a renewable energy project, such as large hydro-electricity projects, outweigh the positive greenhouse benefits of such projects. Large hydro projects have been excluded from the *GreenPower* renewable energy program as a result. The Renewable Energy Act, however, contains the potential to provide bonuses to 'existing renewables' (accrediting large hydro-power schemes which have drowned wilderness areas, though not for the purpose of greenhouse reduction). A third and final example of these definitional and environmental problems can be seen in the benefit of providing credits to large-scale photovoltaic installations (which require GhG-intensive input to produce the product initially). At the international level there is also debate over the use of nuclear power to reduce GhG emissions.

Similar problems arise in providing credits for carbon sinks which may be present purely in terms of historical accident (much like hydro-dams in Tasmania), through isolation and rough terrain, or poverty (a failure to clear native forests for pasture at the same rate or to the same extent as other states or countries because the technical wherewithal was not present), as opposed to conservation for genuine abatement and sequestration.

The questions of how quickly GhG emissions need to be reduced, and by how much, still remain contentious. Globally, and in the majority of countries, use of fossil fuels and emissions of GhGs have grown since 1990. A number of jurisdictions have argued for baseline years other than 1990, as proposed under the Kyoto Protocol. The reason for this is that a baseline year later than 1990 would be easier to achieve. A 1998 baseline, for example, would make the 2008-2012 commitment period more attainable than would a 1990 baseline, as emissions from 1998 were higher than they were in 1990. In deciding baselines it is also necessary to take account of any efficiency measures that are already in place, otherwise early or current emission reductions result in negative economic impact on businesses.

While setting a baseline provides certainty for business, in agreeing to what it should be governments need to minimise the impacts on industries within their jurisdictions. The certainty provided by baseline protection for individual companies is important to drive developments and progress in the industry. The dilemma with setting a baseline, however, is that for it to be seen as an attainable goal by business and governments it needs to be high (particularly given the fact that there is still scepticism over greenhouse science itself). On the other hand, baselines need to be set sufficiently low to have a meaningful effect in terms of controlling climate change. This dilemma has become the crux of a cautionary and conservative approach which may ultimately undermine the Kyoto Protocol entirely, especially as America's President, George W. Bush (representing 300 million people, or 4 percent of the world's population, and 25 percent of the world's greenhouse gas emissions) has announced that his country will not ratify the Protocol. The likelihood that the Kyoto Protocol will be ratified has been seriously weakened by the act, as:

> *... the Protocol will not take effect until it has been ratified by 55 percent of the nations emitting at least 55 percent of the greenhouse gases... this has yet to happen...* [and]*... Bush, a former oilman, has questioned the science behind climate change forecasts and hinted recently that the US no longer supports the Kyoto Protocol* (ENS March 28 2001:1).

And further,

> *President George W. Bush has no intention of supporting any environmental initiatives that could harm the American economy, he said today. ..."We're now in an energy crisis," said Bush. "And that's why I decided to not have mandatory caps on CO_2, because in order to meet those caps, our nation would have had to have had a lot of natural gas immediately flow into the system, which is impossible... Bush said he would work with American allies to reduce greenhouse gases. 'But I will not accept a plan that will harm our economy and hurt American workers', Bush added* (ENS March 29 2001:1).

In Tasmania's case, the choice of baseline by the international community has major ramifications for its ageing industrial base and its future industrial outlook. The Tasmanian government may obtain benefits from either an emissions trading system or from a tradeable market in renewable energy certificates. It will be faced with a decision over whether to use any benefits it acquires to support the retention of those industries in the state. In the current institutional arrangements, benefits accrued by Tasmania would be earned by GBEs. Depending on the rules put in place for these markets, the number of credits or certificates earned by these GBEs may be significantly less than the carbon credits or certificates that industries or state-owned businesses would have to purchase. These may be significant, as attested by the Tasmanian government's Greenhouse Statement. The capacity for the state government to use any certificates or credits for the purpose of retaining industries (or, indeed, attracting new businesses) in the state may therefore be limited. GBEs are also likely to sell credits into forward markets in order to realise economic benefit as soon as possible (we have already seen in the previous chapter that FT is selling carbon rights ahead of any certainty and ahead of the number or value of those rights being actualised).

The result of these decisions will determine how many credits Tasmanian businesses require, and whether or not the Tasmanian government can support acquisition of credits (or prefer to see GhG-intensive businesses cease to exist or substantially change their ways).

> *On a per capita basis, Tasmania's industrial processes (excluding energy and transport emissions) contributed the highest proportion of state greenhouse gas emissions by this sector in Australia. This is mainly due to greenhouse gas intensive industries such as aluminium smelting and cement production* (Tasmania Greenhouse Statement 1999:17).

There is also a risk for the government that these industries may seek to pass on the costs of any carbon credits that they are required to purchase. As Rolfe points out, industries everywhere will be seeking indemnification:

> *Where long-term fixed price contracts commit an emitter to production of greenhouse gas intensive products, the emitter should consider trying to control its potential liability. A producer of greenhouse gas intensive products (e.g.* ***pulp, aluminium or cement)*** *may want the purchaser of their products to indemnify them for possible future costs associated with greenhouse gas emission reduction requirements and incurred as a result of supplying the buyer with the emitter's product* (Rolfe 1999:18).

In Tasmania's case, the capacity of industries to pass on these costs to government is likely to be strengthened by the nature of their existing long term contracts, residual from the days of hydro-industrialisation, with the state-owned electricity supplier (Aurora). These contracts are believed to contain sovereign risk clauses which could protect the companies from liability for increased electricity prices incurred as a result of changes in government policies. That is, the electricity retailer would need to purchase renewable energy certificates (RECs) or carbon credits, but in these instances would be prevented from passing the costs on to its industrial customers. This would adversely impact on the bottom line and its dividends to government. Hence Aurora's operation would continue to be subsidised. The end result of this would be that government would have to pay twice to retain these industries: once to provide them with low cost electricity, and then again by indemnifying them from the costs of any carbon credits or RECs that the state-owned electricity retailer would have to purchase. This situation is likely to be exacerbated as the Tasmanian government continues to pursue a strategy of attracting energy-intensive industries such as magnesite mining and processing, the introduction of natural gas, and the importation of coal-fired electricity from mainland Australia via the Basslink interconnector. As Rolfe points out, investment attraction and new developments involving high emissions will have to recognise the consequences of emitting and possibly pay dearly.

The Tasmanian Government will also have to juggle this strategy with that of maintaining a clean green image by pursuing other developments such as wind farms, eco-tourism, organic farm produce, or expansion of its existing renewable energy

base. There are therefore two potential benefits for the Tasmanian Government in promoting its renewable energy base. One is the need to earn RECs to offset the costs to government of the Renewable Energy act 2000. The other is to promote the state's clean green image. The ability of the state to pursue this strategy has been seriously eroded by the way in which these greenhouse reduction programs have been implemented. In the case of the Commonwealth's new Renewable Energy (Electricity) Act 2000, because existing renewables are not recognised, and will not be eligible for RECs, the state owned electricity retailer will have a liability under the Act. This will require the purchase of RECs equivalent in 2010 to approximately 4-5 percent of its total electricity sales. The anticipated price of those certificates in 2010 is $40 per megawatt hour (MW/h). At current levels of generation of 95000 gigawatt hours (GW/h), this would include a cost of approximately $10 million per annum (Harries, pers comm, 2001). The Tasmanian Government will therefore be unable to earn certificates for existing renewables, while its retailer will have to buy certificates even though it supplies 100 percent renewable energy. The 'renewableness' of this energy therefore provides no monetary advantage for the government.

What this means is that if the largest of Tasmania's industries exited the state, thereby freeing up 60 percent of the state's electricity generation capacity, it would not translate into a windfall marketing benefit of clean/green renewable investment attraction. There is an irony here which challenges EM assumptions that capitalism as it currently functions in Tasmania is necessarily the 'best' mechanism for achieving environmental outcomes. At very least, the signals for moving to clean green modes of production are weakened, and therefore challenge some of the concepts in EM theory.

Greenhouse business opportunities available to the Hydro are not restricted to the development of new renewable electricity infrastructure in Tasmania. Further emission reduction opportunities exist in the form of flexible Kyoto arrangements such as the Clean Development and Joint Implementation mechanisms (primarily targeting greenhouse reducing developments in non Annex 1 countries). Both of these provide opportunities to gain credits prior to the 2008-2012 measurement period.

In summary, under the proposed emissions trading system businesses in Annex 1 countries could accrue credits both locally or externally in non Annex 1 countries. They could generate credits for early action; they could generate credits for alternative energy creation displacing carbon-intensive energies; and they could generate credits for fossil fuel displacement.

With these somewhat uncertain business opportunities, the Hydro, which has historically attracted energy-intensive and greenhouse-intensive industries in its first phase of industrialisation, is entering a new phase of renewable industrialisation intended to capture opportunities and exploit existing competitive advantage in this area. The chairman of Hydro Tasmania (as it now is), in announcing his organisation's intentions to the public, linked this new investment strategy to the old hydro-industrialisation policy:

> *One billion dollars will be invested in Tasmanian wind farms over the next 10 years, increasing Hydro Tasmania's generating capacity by almost 50%. The massive increase will revolutionise power generation in the state and Hydro Tasmania chairman Peter Rae says wind power development will be as significant as hydro industrialisation... Renewable energy is big business with big opportunities for those who position themselves appropriately... We have now confirmed that wind power in Tasmania in the period ahead will be what hydro industrialisation was in the 20th century* (The Mercury 2000:1-2).

The question this statement raises is how the management of Tasmania's hydro assets (be they owned by government or government business enterprise) made the quantum transition from hydro-industrialisation to a 'new clean and green renewable generator' with premium price market advantages. And, indeed, the extent to which it has been a transition or something more superficial involving the rhetoric of major transition but minimal substantive change. The purported change to what might be labelled 'ecologically modern', has emerged from am energy provider based on 'pioneer'-phase landscape alteration and masterful feats of environmental engineering where the key driver was plentiful water and a landscape deemed to be of little value. The following section will describe the historical background and recent changes to the management structure of Tasmania's publicly-owned hydro-electricity assets to assess the extent to which the uptake of EM precepts has in fact taken place.

The Hydro's Environmental Policy: Clean Renewable Energy

We want future generations to enjoy the benefits of a clean and healthy environment and we operate our business with that objective in mind.

We are leaders in environmental management in the electricity industry.

We are committed to:

- *continuous improvement in environmental management practices*
- *integration of environmental considerations into planning and operations*
- *careful management of our land and water resources*
- *wise and efficient use of energy*
- *prevention of pollution and minimisation of waste.*

As a minimum standard, we ensure our activities comply with relevant environmental legislation.

We work closely with the Tasmanian community on matters of environmental interest and concern.

We ensure that our staff have the necessary expertise to fulfil their environmental responsibilities.

We conduct regular reviews of our environmental performance through processes such as environmental auditing. An annual environmental performance report is made available to members of the public.

Hydro Tasmania (2001)

5.2.1 Implications for Tasmania of National Policies and Consequential Development Opportunities

In 1997, the Commonwealth government announced its greenhouse package, *Safeguarding the Future: Australia's Response to Climate Change.* As part of this policy commitment, a legal requirement for electricity retailers and large buyers of electricity from a pool (or directly from a generator) to source an additional two

percent of their electricity purchase from renewable sources, was mandated by the Renewable Energy (Electricity) Bill 2000. The Commonwealth Government under the Act has set penalties for non-compliance initially at $40/MWh (AGO 2000:1). To meet the liability, liable parties will have to purchase renewable energy certificates. Thus, market mechanisms are intended to stimulate an artificial renewable energy trading market, similar to the concept of creating a market for trading carbon rights.

For a renewable energy generator to be eligible for the awarding of certificates, it must have commenced operation after January 1997 or above pre-1997 levels of output. This requires the measurement of existing levels of renewable generation prior to 1997 in order to establish a baseline so as to calculate any increases in generation above historic levels for that generator. The Renewable Energy Regulator has the discretion to set an appropriate baseline for an existing renewable generator.

> *Those eligible renewable energy generation assets commencing commercial operation on or after 1 January 1997 will be able to earn certificates for all electricity provided to the appropriate measurement point, following accreditation by the legislation. Other (pre-existing) renewable generation assets (defined as in commercial operation prior to 1 January 1997) will only be eligible to earn certificates from existing generation assets where they can demonstrate an increase in output from those assets above a relevant historical baseline* (Office of the Renewable Energy Regulator [ORER] 2001)

Consequently, the bulk of the electricity generated from Hydro Tasmania's system will not be eligible to receive certificates. The electricity that is hydro-generated and sold to Aurora will create a liability of 2 per cent. Aurora will therefore need to purchase certificates to cover this. The opportunity to benefit from retro-fitting existing hydro-generation to produce additional electricity will need to be considered carefully. If a baseline for a hydro station in Tasmania was based on a year, or years, that happened to represent low rainfall years, that station could produce well above its baseline in a normal rainfall year, and Hydro Tasmania would receive windfall RECs. If, on the other hand, every power station was upgraded with more efficient turbines

or runners, for example, their baselines could be set at levels whereby RECs gained could never meet the cost of upgrading, let alone the liability (it might simply be easier to instigate a program of cloud seeding to increase regional rainfall). Because Tasmania's system is currently running at full capacity, baselines for Tasmanian hydro-generators are likely to be set close to actual average long-term capacity levels. Thus, the Hydro (and indeed, other existing renewable generators in Australia) is forced in an economic sense to 'test' the ORER, to discover the baseline that will ultimately be chosen. It might be that this case is reflected in a recent report suggesting that bonuses available under the Renewable Electricity Act have stimulated hydro-generators to seek benefits from retro-fitting existing renewables:

> *Early indications suggest that, during the next few years at least, RECs are going to be created largely from landfill gas, wind generation and solar hot water. Significant contributions to the market may also come from additional generation by existing hydro plant that can lift output through improved turbine operation or capturing increased run-off. Relatively small amounts may be provided from other photovoltaics, and mini-hydro... there were 106 applications under consideration of which more than half were from existing hydro plant...* [and Tasmania actually submitted the most of those applications]... (Australian Energy News 2001:14).

The report also highlights the likelihood of existing generators submitting applications in order to test the ORER and 'discover' what baselines will be applied to ascertain whether there are in fact opportunities to receive RECs from those generators. More than half of the applications received were from existing hydro plant, with Tasmanian and New South Wales making the most applications.

A *National GreenPower Scheme* has also been created. The *GreenPower* scheme is a consumer choice mechanism whereby retailers offer *GreenPower* products to customers as a proportion of their energy needs. This proportion is guaranteed by the retailer to have been sourced from a 'green' accredited generator. By nominating preferred 'green' energy sources, and offering to pay a premium, energy suppliers

agree to buy the equivalent amount of energy nominated from renewable sources. It is a voluntary scheme and customers can opt to pay a premium in return for the assurance that the retailer will nominally source that part of the electricity from a 'green power generator'. The government accredits generators as green to ensure consumer confidence.

Eligible *GreenPower* renewable energy resources include:

- *solar power (photovoltaic and thermal);*
- *wind;*
- *biomass (landfill gas, municipal solid waste, agricultural wastes, energy crops, wood wastes). It should be noted that only wood sources from existing sustainably managed forestry plantations and clearing of specified noxious weeds are accepted. Use of any materials from high conservation-value forests is not acceptable;*
- *hydro-electric power (small-scale or on existing dams)*
  Projects must have adequate environmental flows. Projects that involve construction of new dams or diversion of rivers are generally not acceptable under GreenPower;
- *geothermal; and*
- *wave and tidal power* (SEDA 2001).

Neither existing nor new large-scale hydro generation is considered 'green power'. In the case of both *GreenPower* and the Renewable Energy Act's two percent measure, the Hydro is therefore not placed well for environmental/greenhouse competitive advantage. This has significant implications for the state and how the environmental discourse of the Hydro parallels other greenhouse initiatives. The Porter/Thurow disequilibrium of Tasmania's 'overall carbon sink' status, its forests and electricity systems that one would presume are greenhouse favourable, is problematic. Against this background, however, the Hydro is developing new renewable wind generation resources and has announced plans for a major new investment initiative:

> *Further, announcements such as Hydro's $100million wind power project are attracting companies seeking the purchase of green credits* (The Mercury 1999:8).

This new renewable initiative, however, is not without its own environmental impacts, and has attracted protest on both ecological and other environmental grounds. New renewable energy projects are not always non-contentious. In Western Australia for example:

> *In the midst of global efforts to reduce greenhouse gas emissions and Federal Government efforts to increase renewable power generation, objectors have appealed against Glenelg Shire's decision to grant Energy Equity Corporation permission to build what would be Australia's largest renewable energy project near Portland... Objectors, including the National Trust, a local Aboriginal group and residents, have appealed on the grounds of noise vibration and the impact the turbines will have on coastal views. The land is said to be of cultural significance to local Aborigines. The appeal will be heard at the Administrative Appeals Tribunal in June* (Watkins 1998).

Proposed wind farm projects are commonly the source of public concern. Wind farms are located on the basis of the available wind resource and as a result tend to be in exposed, undeveloped regions. They can also have significant environmental impacts ranging from bird collisions, altered micro-climatic conditions, visual amenity and local habitat destruction. The greenhouse benefits of wind farms, however, are widely accepted, and hence there has been a staggering growth in the industry globally.

5.2.2 The Contemporary Policy Environment and the Consequent Attraction of an EM Rhetoric

Both forests and renewable electricity are, in a greenhouse context, central policy and development foci for the Tasmanian government. Both are also very significant to the

Tasmanian economy, and therefore at first glance it would be reasonable to assume that in both cases there is potential competitive advantage to be exploited. It would also be reasonable to expect that forestry companies and the owners of significant renewable-energy resources are making the most of this competitive advantage by embarking on an appropriate discourse. In the case of forestry, Chapter 4 demonstrated this is in fact occurring. Similarly, the Hydro has been shown in previous sections to be evidencing some EM characteristics. Indeed, the Hydro's contemporary motto is '*Hydro Tasmania – the renewable energy business*'. It's core environmental policy can be encapsulated under the headings *sustainability, responsible environmental management, compliance with environmental legislation, open and effective communication, environmental expertise, and reviews of environmental performance* (Hydro Tasmania 2001).

To interpret some of the meaning behind the eloquent discourse of sustainability that the Hydro now conveys, it is interesting to apply EM's tools in the broader context of energy policy in Tasmania – particularly greenhouse. One can thereby question how significant the transition really is, and the degree to which it is, in fact, a sensible strategy.

In the same manner that carbon sink development is constrained by the policy restriction of accrediting forests established on previously cleared land after 1990, only 'new renewables' are likely to gain renewable certificates (or the equivalent credits). As we have seen, 'existing renewables' such as large hydro-electricity schemes are largely seen as 'brown' as opposed to 'green' in greenhouse schemes or the national renewable energy target. The 'greenness' debate becomes very difficult in a policy sense. For example, the Amazon forests may well comprise the largest carbon sink on the planet, but should governments connected to them be provided with a windfall of carbon credits when some of them are actively reducing their sink capacity, as opposed to proactively enhancing them for greenhouse abatement? Member countries of the European Union (who may not have such forest assets) certainly argued early in the development of the Kyoto Protocol that such a situation would be inequitable. Similarly, if greenhouse policies provide existing renewables with a windfall situation, it may undermine adequate stimuli for new generation to

displace greenhouse-intensive energy sources. Essentially, the greenhouse policy stance necessarily becomes one where the overall greenhouse profile must be reduced (taking account of the contributions of existing pre 1990 forests and renewable energy generation), therefore, globally, it is critical to promote additional renewable sources.

As a technological 'add-on' to business-as-usual, retro-fitting existing renewables, and in particular the Hydro's wind farm project, clearly evince EM behaviour. Also of interest is the relationship of this development to other energy policies and strategies in the Tasmania. A large wind farm in Tasmania comes tied with another infrastructure project. Peter Rae, chairman of Hydro Tasmania, has announced that the development of further wind gereation in Tasmania is dependent on Basslink (ABC 2000). The Basslink inter-connector originally touted in the 1960s has been described by Lupton as:

> *Another outward-looking initiative the Hydro was involved in was the long-talked-about submarine cable connecting with the National electricity grid; Tasmania's hydro-electric system would supply the mainland with peak load power and the mainland's coal-fired stations would repay the state with base load* (Lupton 2000:383).

A British company, National Grid, has been selected to develop Basslink. It is not a 'Hydro-owned' project. The greenhouse problem is that the wind farm project is (purportedly) dependent on Basslink, which is in turn, dependent on the importation of coal-fired electricity. Hydro's Basslink Project Manager in a recent radio discussion (Halliday 2001) stated that Basslink would allow Tasmania's 'beautiful' renewable energy to be exported to the mainland, thereby helping Australia meet its greenhouse reduction commitments. It was added that it is for this reason that the Federal government was in support of the project. The problem with these notions is that without building more renewable energy schemes in Tasmania, Basslink would have no significant effect on the total GhG emissions. It misses the point that if wind farms or other new renewables were not built in Tasmania, they would be built on the mainland, and thus the suggestion that Basslink has any greenhouse benefits is problematic. Interestingly, local reports have been made that:

> *Australia would almost certainly fail to meet its mandated renewable energy obligations if Basslink did not go ahead... Tasmania expects to supply between 40 and 50 per cent – valued at $1.4 billion – of renewable energy over the next 10 years. Nationally, 1000 megawatts is required to be generated... without Basslink Tasmanian renewable energy could not be sold into the national energy market...* [and in context]... *Hydro Tasmania has calculated that local wind power generation could commercially provide the 500 megawatts to the national energy market...* [and]... *has the capacity to generate about 2200 megawatts through hydro generation...*[which would not be counted because it is existing renewable energy] ... (Haley 2001:9).

This claim that Basslink would have a positive greenhouse impact by virtue of the fact that it would facilitate wind farm development in Tasmanian, was made in the recently released Draft Integrated Impact Assessment Statement (NSR Environmental Consultants 2001).

> *The Facilitation by Basslink of this scale of wind power development in Tasmanian corresponds to 16% of the Commonwealth-mandated renewables target of 9,500 GWh.*(2001:8-2).

Claims such as this overlook the very nature of the Commonwealth's mandated target. It is the 9,5000 GWh per year of new renewable energy that is mandated. If 16% of this is not produced in Tasmania, it will have to be produced elsewhere in Australia. Basslink, therefore, would on its own have zero impact in terms of achieving the mandated target. These observations would be more plausible if there was a threat to shut down all existing hydro-generation, replacing it with fossil fuel-based generation. Such reports also gloss over the possibility of new renewable generation being built on the mainland, which would obviously not be dependent on Basslink. It must be

remembered however, that Tasmania is also a victim, because it is hampered by the rules contained in national policy.

Basslink, then, is a two-pronged fork: it would allow for the development of renewable energy in Tasmania, but it would be based on the importation of electricity produced from coal-fired generators on the mainland of Australia. Added to this is the complication that RECs will operate in a paper-based trading process (certificates) and thus the use of actual electrons generated is not important. If it is the Hydro's intention to export 'green' electrons via Basslink from its wind resources, by the time these have travelled from the far North West of Tasmania to George Town in the central north of the state, and across 280 kilometres of Bass Strait to mainland Australia, the efficiency losses may render it uneconomic, or at least wasteful. The strategic greenhouse benefit of a wind farm/Basslink relation thus remains unclear. The Hydro's strategy can, therefore, be questioned on a number of fronts. These include the dependency on Basslink; an inability for the state to control liabilities that fall on its own GBEs or old but significant manufacturing businesses; an inability for the state to maximise benefits from credits that may be generated; and finally, with Basslink in place and the export of hydro-electricity there is the dual contingency of drought and no wind (and therefore a greater reliance on imported electricity).

If the government was to pursue the sale or partial sale of the Hydro, its value would increase with Basslink in place, simply because electricity could be sold for much more than before. It appears that there are two fundamental justifications for Basslink: to attain participation in the National Electricity Market (NEM) which should therefore ensure competitive electricity prices in Tasmania; and in preparation of the sale or partial sale of the Hydro. The justification used for community consumption would be that the state is short of electricity and there are only two options available, Basslink or natural gas. Other options such as wind and coal have been shown to be too costly (in the vicinity of 4c to 10c Kw/H, Office of Energy Planning and Conservation 1997) and there are a number of insurance risks to the economy that can be politicised. These include the insurance against the risk that one of Tasmania's major industrials leaves the state, and the insurance costs for drought risk management (including the maintenance and running of the Bell Bay oil fired

power station – soon to be converted to gas). Finally, Basslink allows a small increase in load to be managed without the creation of another major dam that would bring with it oversupply. At a time when government has been, perhaps, over-pessimistic about natural gas options, the role of Basslink was summarised as:

> *Tasmania has now fully exploited this opportunity* [hydro-industrialisation cheap bulk electricity supply] *and is no longer in a position to attract major industries for which low cost electricity is a principal criterion. This era of development is now complete and a new direction is required for Tasmania's electricity industry. Basslink offers the opportunity to take Tasmania into a competitive, dynamic national market that will provide a new set of benefits to Tasmania's hydro-electric system and to Tasmanian consumers. Further, this option will finally allow the state to substantially lower the set of risks, both physical and financial, that have been a feature of Tasmania's hydro system* (Office of Energy Planning and Conservation 1997:48).

The Hydro has been keen to pursue Basslink because it suits its business imperatives. It increases the value of its assets as well as allowing for expansion with a greenhouse gloss. The reality is that, at most, compliance with the mandated two per cent requirement under the Renewable Energy Act 2000 will be achieved, and even this will be at significant cost. If one includes the cost of Basslink as well as the cost of the proposed wind farm (described as mutually dependent), the business case looks doubtful in terms of economic as well as environmental values. If Basslink is justifiable on other grounds, the wind farm scenario might be seen as viable in greenhouse and cost-efficiency terms. During the pinnacle phases of hydro-industrialisation, the Hydro successfully managed a tight symbiotic relationship between government, industry and itself, suiting the interests of three core socio-economic functions: politics (electability); bureaucracy (expansion and growth); and industry (buying cheap electricity). Now. though, the new energy paradigm of retro-fitting, wind farms, Basslink and natural gas is not being presented in the interests of national, state or community wellbeing, but instead in greenhouse terms – and even

then from a narrow perspective. In reality these projects suit entrenched expansionist policies. The Hydro's desire to be a player in the renewable energy game is driven by Basslink, rather than the other way around. It is not necessarily in the public interest, and Basslink can be seen to fulfil the same function as new dams in earlier phases of hydro-industrialisation; indeed 'the new phase of the energy strategy ... builds heavily on the first phase – it is about value adding from the initial investment by the people of Tasmania in the current hydro infrastructure' (Office of Energy Planning and Conservation 1997). With this in mind, it is worth considering some of the enviro-political associations that have been touted as negative consequences of Basslink: the impacts of transmission lines crossing the mainland state of Victoria; and that once Basslink is in place there can never be a viable justification for the draining of Lake Pedder, so that that environmental disaster could never be undone.

Given these problems, the elements of EM that are identifiable in the case of the Hydro are of questionable substance. In the greenhouse sense, this becomes even more clear when we look further afield to the state's push to bring natural gas and associated infrastructure ashore. One would have thought that with the development of natural gas there would be problems selling the notion of Basslink. To date however, this does not appear to be the case. Of the fossil fuels burned to produce energy, natural gas is the least carbon-intensive. This provides a strategic EM advantage to both government and industry. However, in a state which claims to be an overall greenhouse sink, the importation of new non-renewable energy sources has to be seen in light of their contribution to the state's overall greenhouse profile. Natural gas in Tasmania, if described as a greenhouse friendly option, is very much a development-oriented, business-as-usual EM-characterised initiative. In very much an EM style, Duke Energy, the company responsible for the natural gas project in Tasmania, claims greenhouse and wider environmental compatibility:

> *Duke Energy is committed to building a diverse, secure, reliable energy business. We believe it is the best approach for promoting environmental benefit in accordance with our values regarding cultural sensitivity, economic development, resource conservation and facilitating quality of life improvement* (Duke Energy 2001).

While a number of other renewable energy projects have been mooted in Tasmania, these tend to display weak EM, in that they also represent a 'development-as-usual' approach wrapped in a veneer of sustainability. An example is the solid waste incinerator proposed for southern Tasmania:

> *The first new city garbage incinerator project in Australia has gained an economic boost with the passage of the country's renewable energy legislation... under which electricity retailers must source two percent of their power from renewable sources by 2010. City solid waste and native forest wood waste have been written into the bill as eligible sources...* (ENS Dec 12 2000:1).

There is little evidence to suggest that this or other renewable energy projects (such as forest residue steam generators) are based on a genuine attempt to improve the impacts of energy generation on the environment (or, strong EM principles). Furthermore, they tend to be improbable proposals based on markets that have yet to materialise or on the hope that Basslink will provide such a market.

In concluding this section it is worth noting a paradox which challenges both the ethos of the environment movement and highlights the contradiction of EM business and policy initiatives. The Greens have displayed internal conflict over their position on existing renewable infrastructure. The Green member for Parliament stated in Parliament that the Greens:

> *... would prefer Tasmania... to remain a State that bases its energy supply on renewable energy that is* ***environmentally clean*** *and* ***ecologically sustainable****... looking at the existing hydro system plus some small-scale new hydro from an environmental point of view... to supply energy without adding to pollution or the greenhouse effect or destroying environments... there is a real market advantage for Tasmania in establishing itself as a supplier of that type of green energy... together with our image of being*

> *clean and green, of having pristine wilderness areas that people can actually locate their industry and their manufacturing here, on the basis that they could then swear to the world that they only use these* ***extremely ecologically friendly means of supplying energy*** *as part of that production input... for decades Tasmanians have been paying inflated prices for electricity in order to subsidise the cheap electricity that is going to the bulk-power users...* (Putt 2000).

Within a new EM and greenhouse-oriented discourse, hydro-electicity has been repackaged to an extent that has not only confused proponents and policy makers, but has also confounded the environment movement (discussed below).

I have shown that Tasmania's existing renewable energy assets and industry structure are are not well placed to gain competitive greenhouse advantage, despite the discourse and perceptions that these are 'green'. Clearly, those aspects which EM theory targets for analysis have assisted to create such a picture. In 1998 a Labor Government was elected in a landslide victory, primarily on the promise that Tasmania's monopoly public hydro-electricity utility would not be sold. The community generally, and despite their history of conflict with it, the Greens specifically, view public ownership of the Hydro and 'clean' water-powered electricity as positive.

'WE'LL TAKE NUCLEAR POWER OVER BURNING FORESTS' - NSW PUBLIC

The NSW community would prefer nuclear energy to energy sourced from wood fired power stations, according to a poll conducted by the State's leading environment groups.

The Roy Morgan Poll revealed that almost 90% of respondents opposed the burning of native forests to provide energy, with fewer believing it to be renewable (8%) than nuclear power (12%).

The poll was commissioned by The Wilderness Society on behalf of the State's leading environment groups, including the Nature Conservation Council of NSW (NCC), the Colong Foundation and the Total Environment Centre (TEC).

According to conservationists, the future of schemes designed to attract more people to renewable energy is being tarnished by the image of the State's forests going up in smoke.

"We are being told that burning forests for power is 'clean, green energy' and that simply hasn't been accepted by the public," said NCC executive officer, Kathryn Ridge.

"The Government has been strong in encouraging people to choose cleaner, more renewable energy sources, but burning our forests for energy is not clean, not efficient and certainly not renewable. If this 'clean, green' line about biomass continues to be sold to the public it isn't going to wash and it might take the whole clean energy market down with it.

"When asked, three quarters of the respondents said they would choose solar energy and the second most popular option was wind power. These are truly renewable energy sources and they are the future of responsible energy generating".

"People are understandably concerned about this issue and I don't think they will buy into a scheme that has such a big question mark over it," Ms Ridge said.

Other findings of the Morgan Poll include:

- 87% of respondents would choose solar power over all other forms of energy if cost were not a factor;
- More people regard energy from coal fired power stations as renewable than wood fuelled energy; and
- Environment groups are the preferred source of information about renewable energy (42%), over energy companies (29.3%), power generators (28.6%) and government (17.1%)

Nature Conservation Council of NSW (2001)

The desire to retain the Hydro in public hands probably emanates from the significant role it has played in forming modern social and political history in Tasmania: it has been the most important conduit for a migrant workforce; and the most important conduit for government spending and large engineering projects. It is also the key generator of the environmental controversies that led to the emergence of a potent green politics; and the 'clean environmentally friendly' energy it generates, based on a lake system which has tourism potential, are also possible sources of support for a public sector Hydro.

There may also be other more profound connections to notions such as Dryzek's 'tidy household' (see Chapter 2), in which little real change at home in domestic consumption (as long as products are labelled 'dolphin friendly') needs to occur for people to feel they are promoting a sustainable future. In this case, consumption of hydro-electricity can be comfortably assimilated as environmentally benign, and any impetus for energy conservation conveniently ignored.

Yet, it has been shown here that Tasmania's significant renewable hydro-powered energy resource may be 'clean', but it is not necessarily 'green'. Its utility is not extended through efficiency measures. *Post hoc*, the environmental devastation caused by dams significantly challenges attempts to exploit opportunities through EM rhetoric and a greenhouse-derived economic advantage. This brown status is confirmed in national policies that will not permit environmental premiums to become a profit basis, because national policies recognise that Tasmania invested in its hydro-infrastructure for monetary, not environmental, reasons, and having done so, consider that the state should not be in a position to benefit.

5.3 Conclusion and EM Discussion

In the Foreword to Lupton's historical account, Sir Allan Knight, HEC Commissioner from 1946 to 1977, encapsulates the ecological modernisation process while at the same time highlighting the weaknesses an EM rhetoric gives to a genuine ecological discourse:

> *It is unfortunate, in my opinion, that Tasmania has been denied the opportunity to develop the power resources of the Lower-Gordon as originally planned. Perhaps when the non-polluting value of water is more fully appreciated, wiser counsel will prevail* (2000:7).

The EM implications of these comments are that the possibility of damming the Gordon-Below Franklin could one day be re-considered, but this time on environmental grounds. This position should not be underestimated, for it has been demonstrated here that greenhouse politics provides potential means to such possibilities. My framework provides three sites for analysing the competitive environment in which the contemporary Hydro operates. It is a framework in which to assess the extent of institutional learning, and thus elaboration of these issues.

The first site is that of the Tasmanian Government, managing a state in a manner characterised by persistent 'desperation' when it comes to economic policy, and retaining a political will to seek for projects similar to the major engineering projects of the past.

There are questions about how it has attempted to fill the hiatus left by the demise of hydro-industrialisation. How genuine is the shift from a view of hydro-power as a cheap source of energy to one of a clean and environmentally beneficial energy source? How does this fit with the Basslink and natural gas proposals, and other 'green' energy proposals? To what extent have the traditional political parties successfully marginalised their Green rivals while borrowing a minimal amount of their ideas and discourse in order to do so?

The second site is that of the Hydro itself. Questions here include: how has the restructuring within the Hydro itself (for example the demise of the Power Engineering Branch, and the replacement of hydro-engineers with financial and accounting managers) altered the way that hydro-electricity is viewed? What are we to make of the Hydro's reaction to the greenhouse issue in terms of its attempt to maximise the benefits for its renewable energy and its interest in developing new renewable energy sources? And what of its participation in engineering opportunities presented by new developments such as natural gas and Basslink?

The final site is the environment movement. A number of dilemmas highlighted in this chapter are similar to the dilemmas pointed out by critics of EM as an ideology. The ascendancy of the greenhouse issue and the ambivalence on the part of the environmental movement over Tasmania's hydro-electric assets is demonstrated by the latter's late advocacy of a new economic 'vision' for the state based on promotion of the state's clean, green image and embracing its hydro assets as the basis of that new image, while some sections of the green movement continue to press for a roll back of past hydro-electric developments (Pedder 2000). Ironically Harries notes:

> *As an alternative to further hydro-electric development, many environmentalists supported the thermal option, justifying this on the grounds that a coal-fired power station would not pose a pollution problem since the emissions from coal-fired stations all occurred naturally in the atmosphere in large quantities and were therefore innocuous (Johnson 1972:76). The HEC ridiculed the environmentalists support for a coal-fired plant by adopting the slogan 'HEC: Power*

without pollution'. Environmentalists parried with their own 'HEC: Power without Purpose' (Harries 1996, Appendix 1:23).

This chapter has demonstrated the tension that is the legacy of past environmental campaigns against large hydro-schemes, with such schemes now tainted as 'third class' or 'brown' renewable energy. Policy-makers and consumers pursuing the *GreenPower* schemes and the two percent measure appear to be wanting to divorce themselves from hydro-electricity. This is tied in with the shift in discourse and terminology from 'renewable energy' to 'sustainable energy' to 'green energy'. It remains unclear how environmentalists regard Tasmania's hydro-electric energy within this spectrum, and if they regard it as 'not so clean and green', what are the implications for its use as a marketing strategy and for demanding green premiums? This lack of clarity as to the environmental status (based on 'renewableness', 'cleanliness', or 'sustainability') of large dams and 'existing' large dams, in particular, may be attributable to ambivalence within the environmental movement.

EM provides a position from which to describe discourse and policy issues. It also highlights that the hydro-industrialisation ethic may have changed in character (because of restricted opportunities for large scale dam development), but it still thrives. Underpinning all the greenhouse rhetoric is a strong echo of hydro-industrialisation from the past. The general energy policy context which the government is pursuing demonstrates this:

> *Natural gas could spark an economic boom in Tasmania... the boost could be similar to the early days of hydro-industrialisation*
> (Mercury 2001).

The natural gas and Basslink projects have profound implications for future economic development in Tasmania, as well as the state's greenhouse profile and the role of the Hydro within this. The disaggregation of the Hydro described earlier in this chapter has been advocated by many and diverse political camps, including the Greens. One interesting incentive for the government to break-up the Hydro is to improve the potential for its sale (either as a whole or in part). The notion of selling off public

utilities has many converts, and as a target to aim for in both policy and planning, a number of strategic steps can be taken to make assets attractive to the public investor. Competition, markets and the role of other utilities is critical in such a strategy.

During the 1980s-1990s the sensible political position was one of scepticism towards Tasmania ever achieving a natural gas system, or state-based green-field energy source (such as a new hydro scheme or coal-fired generator). The most likely project on the books was the Basslink interconnector, which could dramatically increase the value of the Hydro and its assets. I submit that there were two fundamental reasons for the Basslink project; one is that it would facilitate participation of the Hydro in the National Electricity Market (NEM) and thus encourage competitive prices in Tasmania (generally regarded as having high electricity prices to those not privy to past hydro-industrialisation agreements); the second is that in preparation for selling the Hydro, a justification to the public is that as a state we have reached our sustainable maximum generation capacity and may come up short in the future. With this in mind, the state had two plausible options: Basslink or gas. While other options such as wind and coal were touted, they were double the cost (approximately 8c KW/h compared to 4c KW/h for the electricity supplied from natural gas or Basslink). Added to this, there needed to be a fall back or insurance position in the event of a major industrial leaving the state. Basslink was preferred as it would allow a small increase in the electricity load and avoided the traditional problem of oversupply linked to new capacity. Conversely, if load fell as a result of a major customer closing, hydro-generated electrons could be exported to Victoria.

With the Basslink project now progressing as a reality, it is interesting that during the project development natural gas has become a reality as well. The problem for the government became how to sell gas *and* Basslink instead of gas *or* Basslink. For obvious reasons, the Hydro would be keen to pursue Basslink because it suits them to do so: it would increase the value of its assets while also allowing for expansion (a new lifeblood for the old engineering branch). Much of the project announcements and institutional changes are couched in greenhouse terms, but the reality is that meeting the national two percent measure will come at a high cost to Tasmania. On the one hand it is said that the development of a wind farm is dependent on Basslink, and on the other

that Basslink is viable only if both import and export of energy occurs, because without Basslink there is said to be no capacity to sell the energy generated from the wind farm. Thus, it follows that if one is to include the cost of building Basslink as well as the cost of building the wind farm, the economics are dubious and the greenhouse benefit marginal. However, if Basslink is in place for various other reasons it can be argued that the wind farm project could be justified on greenhouse reductions.

In the early phases, hydro-industrialisation moved from strength to strength based on potent symbiotic relationships between government, the Hydro and industry that suited the interests of all three parties: politics; bureaucracy (its own expansion, as well as the potential for industry attraction); and industry (buying cheap power). The parallel now with the wind farm and other 'green' pursuits is that it is not the interest of the nation, the state or the community that is driving change. The greenhouse justification is convenient and used only from the narrowest perspective. The real benefit for developing wind resources, chasing the mandatory target and encouraging Basslink, is that it fits the same development ethic that lay behind hydro-industrialisation. The Hydro's decision to be involved in the renewable energy game is driven by Basslink rather than the other way around. Thus, current 'green' initiatives in the present arrangements of the Hydro evidence, at most, elements of weak EM.

Two negative aspects about Basslink can be observed, particularly in an EM context. The proposed transmission lines across Victoria will impact on environmental, social/cultural values. And the cable once in place would undermine potentially 'greener' initiatives such as the draining of Lake Pedder or the restoration of the ecological damage of historic dam sites. From a green ethical perspective, therefore, the environmental disasters of the past in Tasmania could never be undone.

6. Conclusion

Sustainability and EM terminology are both characterised by optimism concerning the prospects of a greener capitalist future. This paper has used Tasmania as a case study to compare this optimistic picture with what happens on the ground. It has done so by looking at what constitutes a greenhouse industry and then using this to analyse the assets that the Tasmanian government has at its disposal to market itself as clean and green, particularly from a greenhouse perspective.

At first glance, a study of Tasmania suggests that Hawken *et al's* future progress toward a natural capitalism can call on a positive competitive advantage (1999) - the state has large tracts of wilderness and forest estate, as well as significant renewable energy assets. When one digs deeper, however, by analysing what is likely to comprise a 'legitimate' greenhouse industry, cracks begin to appear in the optimistic picture. Central to 'legitimate' greenhouse activities are the requirements of exhaustive measurement, baseline establishment, verification of emissions and sequestration - all of which require particular circumstances, a coherent time scale and a technical capacity to interpret and rigorously account for change. The two greenhouse cases used in this study have shown that, despite a dominant ethos of developmentalism, Tasmania actually lacks exploitative greenhouse opportunities, due to the limited amount of cleared land and post-1990 tree planting, together with an infrastructure of renewable energy assets that are excluded from renewable incentive programs and policies. In addition to this, it has been shown that the rules and definitions of greenhouse measurement and monitoring are at the mercy of international and national politics, whilst, on top of this, there is even the possibility that the core greenhouse driver, the Kyoto Protocol, will never be ratified now that the US has indicated that it does not intend to be a signatory. In this case, the environmental learning and rhetoric that FT and the Hydro have tried to take advantage of will have been to little or no avail.

The picture which emerges thus differs from the opportunistic one presented by government, industry, and most commentators. The environmental transition that appears to have occurred in both case studies is therefore questionable. The extent of its genuineness is in doubt, and it appears to be characterised by weak EM. While an environmental discourse has been learned, it is undermined by the lack of guarantees on multiple fronts: development of renewable energies is contingent on Basslink; to obtain any benefit for the state, government may need to accrue carbon credits and use these to retain the state's industrial processes (or as a drawcard for new businesses); the ability to acquire carbon credits, is however, constrained by the lack of land for sink development; and a reliance on further renewable energy exposes the state's energy system to drought-induced shortages or failures due to lack of wind. The state has two options: one is to attract forestry investment by enabling external interests to accrue carbon credits, as well as privatising energy management entities to an extent that their competitiveness does not allow them to guarantee one another the benefits of renewable certificates generated here; whilst the other option that the state could take (but has not considered) is to retain all credits from its forest and energy activities in order to attract clean industries or retain existing industries that may hurt when an emissions market evolves. This option is, admittedly, complicated by the question of who would accrue any RECs or carbon credits. In any case, the government has already chosen its option, and this provides further evidence that the EM that appears to be taking place is either not real, or is critically weak.

Proponents of EM would argue that the ecological learning is genuine. This is based on the belief that environmental care becomes critical to competitive advantage and is increasingly a requirement for global market participation. But perhaps EM attempts to reconcile the irreconcilable:

> *'Environmentalism' and 'industrial capitalism', are thus discourses competing at a more fundamental level of meaning... The green discourse is a complex interaction of ideas and values that flow from first principles...* [and not economic efficiency]... (Hay 1994:109).

Despite this fundamental discord EM has significant collective support, and as a theory it has enabled this study to frame greenhouse development opportunities and associated discourses. However, on application it fails to effectively account for conflicting political and economic forces in small, economically strained economies. In effect, EM theory overlooks the *degree* of weakness in its weak versions. There is a need to look at how the specific characteristics of local economies will affect the relationship between economy and the environment. Without such local adaptation EM is too crude an analytical tool to apply successfully to such places as Tasmania. Tasmania has, in fact, been chosen partly because it represents an extreme case that allows weaknesses in EM theory to be thrown into such sharp relief. EM theory implicitly assumes the typical 'Euro-Americo developed economy'. It does not fit Tasmania, and there are likely to be many other situations, less 'extreme' than Tasmania, for which EM theory is also unable to take accurate account. In fact, it is the developed economies assumed by the theory that may be the 'extreme', with a majority of countries not fitting the mould, in which case EM theory is based on a minority of conditions that are not generalisable, and thus not adequate to provide a base for general theory.

The Bush Administration has also shown EM to be tenuous even in the strongest of developed economies. By refusing to ratify the Kyoto Protocol the US government has demonstrated that non-implementation of environmental policy critical to EM is indeed a real risk – yet this risk is never acknowledged by proponents of EM. While there remains no definitional consensus, Christoff (1996) argues that EM is being applied to technological adjustment; policy discourse; belief systems and deeply embedded, ecologically self-conscious forms of cultural transformation. Such ambiguity, he warns, 'may serve to legitimise the continuing instrumental domination and destruction of the environment' (Crowley 1996:627). Similarly Welford notes that:

> *A common characteristic amongst businesses is only to do as much as they perceive to be absolutely necessary. At the same time, what they do is often given an extraordinarily high profile. For example, it is increasingly common for businesses to draw up an environmental*

policy. As such that is a good starting point but all too often one hears 'that's our policy, we've got one – it shows we are doing something'. Even those companies who produce environmental reports (and they are sometimes produced from very dubious reasons) still operate as if the environment were an add-on to give them a competitive advantage... [but]*... fails to deal with the real challenge facing industry: to do things differently* (Welford 1997:33).

Welford (1997) critiques academic proponents of EM on the ground that their trust in a theory determined by discourses created by industry rather than by real events is damaging to environmentalism and will ultimately prolong a business-as-usual approach and the destruction of the environment. True enough, but Welford himself fails to appreciate that what EM actually helps highlight is 'insight into itself' as a phenomenon. Revisiting the notion of EM as having prescriptive and descriptive bases (outlined in Chapter 2), the extent of the former can be tested by applying the latter. Prescriptive EM establishes a set of rules as to what might constitute strong or weak environmental performance and ecologically-based cultural transformation, and observation of its application in the real world can be tested by description through case studies. This provides a sound opportunity to expose environmental problems in contemporary economic activities, including: identifying evidence of policy shortfalls; or as this thesis has demonstrated, to describe scenarios from various positions to shed light on policy debt and rhetorical discourse. Welford appears to imply this positive aspect of EM, but without elaboration:

The ecomodernist approach sees the future as being a product of what went before. Environmentalism, it asserts, must therefore be embedded in what is here and now. The postmodern perspective, which would see the environmental debate more associated with a break from the past, is largely ignored and the usual approach taken to environmental strategies is therefore largely integrationist. In other words, corporate environmental management is integrated into (or worse, bolted on to) business as usual. The most significant question

> *therefore revolves around the importance attached to environmentalism* (Welford 1997:32).

But even if EM implies integration with business-as-usual and a watering-down of genuine environmentalism, it nonetheless provides a sound platform for critical discourse analysis. Though EM is a crude theoretical tool, it has been shown that it does provide useful insights. The real problem, theoretically (as opposed to EM in practice), is that it does not take into account the new environmental imperatives of different economies and situations, and certainly misses the target when it comes to more marginal and remote economies such as Tasmania. Theoretically, therefore, EM provides a starting point from which to analyse supposedly enlightened environmental activity. In the first instance it can be observed as it ostensibly takes place in a variety of situations. Observation of activities provides the basis of description, but description alone does not provide the necessary attributes to evaluate what is taking place. Analysis of behaviours observed against a set of criteria is required to informatively assess change or reform. EM provides two dimensions (strong and weak), but does not drill down in either case - this is particularly evidenced by EM's inability to really explore the environmental implications characteristic of the weakest versions of it. As Frijns *et al.* conclude:

> *If ecological modernisation theory is to be used to outline a feasible path of environmental reform,* [as opposed to methodological approaches to academic analysis] *it has to be refined... to fit the specific local conditions and institutional developments of industrialising countries* (Frijns *et al.* 2000:1).

The Tasmanian case studies presented here demonstrate that EM is prescriptively unsatisfactory not only in industrialising countries, but it is equally suspect in its application to struggling industrial economies. Such economies are not 'abnormal' but are in the majority. Even at the centre of technologically advanced capitalism EM seems precarious at best, as evidenced by President George W. Bush's latest stance on energy availability and generation. We are now, it seems, much better placed to respond to Sonnenfeld's questions:

> *Together, such technological/material objectives, mechanisms and institutional dimensions of ecological modernisation provide a useful starting point for evaluating the applicability of the theory to particular cases ...* [and] *analysis addresses two questions: to what extent have* [particular activities or behaviours] *'ecologically modernised' in recent years?* [And] *how have these changes taken place?* (Sonnenfeld 2000:237)

We have indeed observed EM occurring in two cases, placed observations in historical context, and questioned the extent of these changes. The latter, however, generates still more questions rather than providing an informative policy trajectory. Our two case studies have highlighted the fact that greenhouse reducing incentives such as emissions trading (when combined with micro-economic reforms, including privatisation) leaves the government in a lose-lose situation because its ability to retain credits or guarantee actual emissions reduction is removed. Added to this, if Tasmania as a state is to benefit from its clean green, and carbon sink status, the government and economy will be beholden to external expertise to verify emissions and sequestration simply because the state does not presently have appropriate expertise. Therefore, if verification has to be paid for, it is likely that benefits gained (from 'environmental credits'), would be countered by accounting costs. Credit markets are developed to incentivise business behaviour, making environmental stewardship subservient to bottom-line business efficiency. The creation of artificial commercial incentives to 'clean up' the environment by 'rewarding' environmental stewardship and penalising business-as-usual, however, institutes a dilemma. Conformance to such policies can come at very high cost which can create perverse incentives – this in turn undermines core EM assumptions such as eco-efficiency, and hence a propensity to continue environmentally destructive behaviour. To further muddy the waters, it has been shown that 'good jobs' are not always seen as 'green jobs' and that Tasmania is doing little or nothing to promote any benefits associated with eco-friendly work. More broadly:

There are formidable obstacles to the implementation of a comprehensive and broadly effective environmental policy. These obstacles stem not from the nature of liberal democracy but also from the nature of environmental quality as something that is hard to effectively legislate for: such characteristics as the ubiquity of environmental decline; the insidiousness of environmental problems (or the absence of immediately apparent cause-consequence relationships); the problem of 'death by a thousand cuts' as environmental degradation accumulates by concentrating the seemingly unimportant consequences of innocent private decisions taken by individuals at a sub-policy level; and the problem that policy is only as effective as government's capacity to monitor and regulate, this latter an important emergent problem as the very potency of government as an institution goes into decline... (Hay 1994:119).

When exploring these case studies from an EM perspective, there is evidence that corporate and governmental rhetoric is used to beguile the public through a repackaging of old policies in environmental (in this case, greenhouse) discourse. It also shows that there may be, in parts of the commercially-tooled bureaucratic commercial structures, some genuine attempts on the part of some actors to redirect their organisations down more environmentally benign business paths. This is partly because such activities constitute good public relations - and partly because such initiatives are genuinely deemed to be environmentally sound and socially responsible. However, exploration of the cases has shown that the actual capacity of businesses to go down this path can be severely constrained, with considerable confusion over the degree to which the organisation can actually benefit from taking such a route (particularly, in this instance, because the relevant global policy regimes, as we have seen, are still in a state of flux). The combined effect of the EM agenda and greenhouse policies has induced an over-optimism in regard to the extent to which Tasmanian government business enterprises can profitably embrace greenhouse development opportunities:

> *... there are issues as to who owns the emission reductions. It is possible that the emission reductions achieved by increasing the energy efficiency of a home could be claimed by the homeowner, by the company selling energy efficient appliances or by the company undertaking the retrofit. While this broadens the list of companies with the potential to profit from emission reduction activities, it increases the uncertainty for companies investing in emission reductions* (Rolfe 1999:15).

It is likely that the constraints revealed in the case studies presented here will also apply in other small resource-oriented capitalist economies. The Tasmanian case generally becomes one of risk taking, where the endeavours of governments and businesses are likely to collapse, because they will be seen by future investors, and society more generally, to be embarking on an ecologically weak and rhetorical exercise, in which the so called 'green' initiatives are without substance. As a discourse, then, EM has some validity as a tool to aid description; as prescription however, it may merely involve an exercise in sleight of hand, aimed at promoting an appearance of change while leaving essentially unchanged the tried-and-failed realities of an old paradigm:

> *...a paradigm resting on axiomatic assumptions concerning the inevitability and rightness of a timeless human progression set upon the conjoined pillars of unalloyed human reason and scientific method...* [where]... *environmental policy also suffers in the weighting of priorities by virtue of environmental integrity's status as a public rather than a private good – at a time when human wellbeing is increasingly seen as a private rather than public quality* (Hay 1994:119).

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Appendix: Environmental Industries – Elaboration of Categories and Extended Definition as Proposed by the OECD and Eurostat

1. Core Activities

A. Environment Goods

Production of equipment, technology and specific materials for:

1. Air pollution control
    - *1.1 Air-handling equipment*
    - *1.2 Catalytic converters*
    - *1.3 Chemical recovery systems*
    - *1.4 Dust collectors*
    - *1.5 Precipitators*
    - *1.6 Incinerators, scrubbers*
    - *1.7 Odour control equipment*
2. Waste water management
    - *2.1 Aeration systems*
    - *2.2 Chemical recovery systems*
    - *2.3 Biological recovery systems*
    - *2.4 Gravity sedimentation systems*
    - *2.5 Oil/water separation systems*
    - *2.6 Screens/strainers*
    - *2.7 Sewage treatment*
    - *2.8 Wastewater reuse equipment*
    - *2.9 Water handling goods and equipment*
3. Solid waste management
    - *3.1 Hazardous waste storage and treatment equipment*
    - *3.2 Waste collection equipment*
    - *3.3 Waste disposal equipment*

3.4 Waste handling equipment

3.5 Waste separation equipment

3.6 Recycling equipment

3.7 Incineration equipment

4. Remediation/cleanup of soil and water

4.1 Absorbents

4.2 Cleaning-up

4.3 Water treatment equipment

5. Noise/vibration control

5.1 Mufflers/silencers

5.2 Noise deadening material

5.3 Vibration control systems

6. Environmental monitoring, analysis and assessment

6.1 Measuring and monitoring equipment

6.2 Sampling systems

6.3 Process and control equipment

6.4 Data acquisition equipment

6.5 Other instruments/machines

B. Environment Services

Provision of services for:

7. Air pollution control

8. Waste water management

8.1 Sewage treatment systems

8.2 Wastewater reuse systems

8.3 Water handling systems

9. Solid waste management

9.1 Emergency response and spills cleanup

9.2 Waste handling -- collection, transport and disposal

9.3 Operation sites

9.4 Recycling

9.5. Operation of recycling plants

10. Remediation/cleanup of soil and water

10.1 Cleaning-up

10.2 Water treatment equipment

11. Noise/vibration control

12. Environmental contracting/engineering

12.1 Engineering design/specification/project management

12.2 Biological and ecosystem studies

12.3 Environment impact assessment, audits

12.4 Water treatment

12.5 Environmental planning

12.6 Risk and hazard assessment

12.7 Laboratory and field services

12.8 Environmental economics

12.9 Legal services (environmental law)

13. Environmental research and development

13.1 Environmental knowledge

13.2 Environmental protection aspects

13.3 Environmental management

14. Analytical services, data collection and analysis

14.1 Measuring and monitoring

14.2 Sampling

14.3 Process and control

14.4 Data acquisition

14.5 Others

15. Environmental education and training, information

15.1 Environmental education and training

15.2 Environmental information searching service

15.3 Environmental data management and analysis

2. Non Core Activities

A. Environment Goods

Production of equipment, technology for:

1. Potable water treatment

1.1 Potable water treatment

1.2 Water purification systems

2. Other recycling systems

2.1 Other Recycling systems

3. Renewable energy plant

3.1 Solar

3.2 Wind

3.3 Tidal

3.4 Geothermal

3.5 Other

4. Heat /energy management

5. Cleaner/efficient processes

6. Cleaner/efficient products

7. Alternative agriculture/fisheries

8. Sustainable forestry

9. Others

B. Environmental Services

Provision of services and construction for:

10. Other recycling/recovery plant

10.1 Other recycling systems

11. Renewable energy plant

11.1 Solar

11.2 Wind

11.3 Tidal

11.4 Geothermal

12. Amenity/conservation

12.1 Soil and water conservation

12.2 Pest control

12.3 Potable water supply and distribution

12.4 Wildlife and natural habitat

13. Alternative agriculture/ fisheries
14. Sustainable forestry
    - 14.1 Reforestation
    - 14.2 Forest management
15. Eco-tourism
16. Other services (e.g. industry associations)

source: OECD (1996b)

the meeting of the OECD/Eurostat Informal Working Group on the Environment Industry, Luxembourg, 26-27 April.

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